The Iron Age

A Review of the Hardware and Metal Trades.

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The Iron Bridge at Booneville, Mo.

From a letter of Mr. D. C. Brookes to the Chicago *Railway Review*, we take the following:

Probably the most extraordinary "feat" in bridge building ever performed in this or any other country is that now approaching consummation in the construction of the bridge across the Missouri River, at this point, by the Missouri, Kansas & Texas Railway Company. Here is an iron truss bridge 1638 feet—or more than one third of a mile—in length from center to center of abutments; resting on piers partly of stone and partly of iron pneumatic tubes, and having a draw with two openings of 160 feet each in the clear—wholly completed (if finished, as is assured by January 1st next) in the brief period of about *ten* months. This unexampled progress is due (not omitting, of course, to recognize the energy of one of the most enterprising of the great railway companies of the West, possessed of the ready money to command every facility and to improve every moment of time) to the facts that the topography and *regimen* of the impetuous current of the Missouri were now thoroughly understood in the light of previous successful attempts; that the best known, and, doubtless, best possible modes of sinking foundations, whether of stone or iron, through deep and shifting sands to the solid rock bed had been arrived at; and that the railway company availed itself of the services of engineers thoroughly experienced in every process required, seconded by the efforts of an organization (the American Bridge Company, of Chicago) whose history is peculiarly identified with bridge construction over the Missouri River. The work has been prosecuted under the immediate supervision of Mr. O. B. Gunn, the Chief Engineer of the Missouri, Kansas & Texas Railway Company; with William Sooy Smith as engineer of the bridge, and the American Bridge Company as the contractors for the work. In the month of October and November, 1870, General Smith made the preliminary surveys, and selected the location for the bridge. Work was not actually begun till Sept., 1872; and very little was done, except in the way of preparation, until the opening of the spring of 1873. From that time to the present work has been literally "pushed,"—being carried on night and day, week in and week out, without even a Sabbath day's rest.

On the line chosen for the bridge a table of rock extends from the south bank (here quite precipitous) out under the stream 500 feet, with a depth of water thereon, at low water, of from 10 to 15 feet; for the next 200 feet the rock drops off to a depth of 33 feet below low water; and from thence to the north bank to a depth of 54 feet below low water. The width of the river at low water is 1000 feet, and at high water 1600 feet, and the total length of the superstructure is 1639 feet. The location from bank to bank is 3200 feet. Beside the main channel, there was in the natural state of the river a secondary channel of 1000 feet on the north side, with an island 700 feet wide between. In locating the bridge it was decided to fill up the secondary channel and also to fill in partly across the island, making a heavy dyke, thus—by entirely damming the secondary channel—throwing all the water into the main channel on the south side of the island. This dyke was completed about the 1st of January last, before the annual rise. The effect of the high water was to completely scour out the sand bar obstructing the main channel, greatly to the benefit of navigation; also to scour out the sand from off the rock, leaving it bare at (pivot) piers 1 and 2. The dyke, containing 125,000 cubic yards of earth, has its slopes thoroughly riveted with brush (as at the St. Joseph Bridge)—no stone being used—to 4 feet above high water. The water this year was the highest since 1867; yet no damage occurred to the dyke. The effect on the river has been to form a heavy natural dyke across the upper end of the slough, one mile above the bridge, and also across the lower end 1000 feet below the bridge, thus shutting the water off from the slough entirely.

The bridge consists of eight spans: 2 (fixed) of 258 feet each; 3 do. of 225 feet each; a draw span (two openings), having a total length of 363 feet, and an approach span on the north side of 84 feet, making a total length of 1638 feet.

The following are the total quantities used in the substructure:

First class masonry, cubic yards	4,222
Concrete, cubic yards	2,354
Rip rap, cubic yards	2,268
Earth embankment (approaches)	110,000
Timber (in feet board measure)	482,576
Pneumatic cylinders (lineal ft. 668), tons	600
Wooden piles (foundation of abutments), lineal feet	2,652
Wrought iron drift bolts, etc., lb.	60,606
Cast iron braces, washers, etc., lb.	24,300

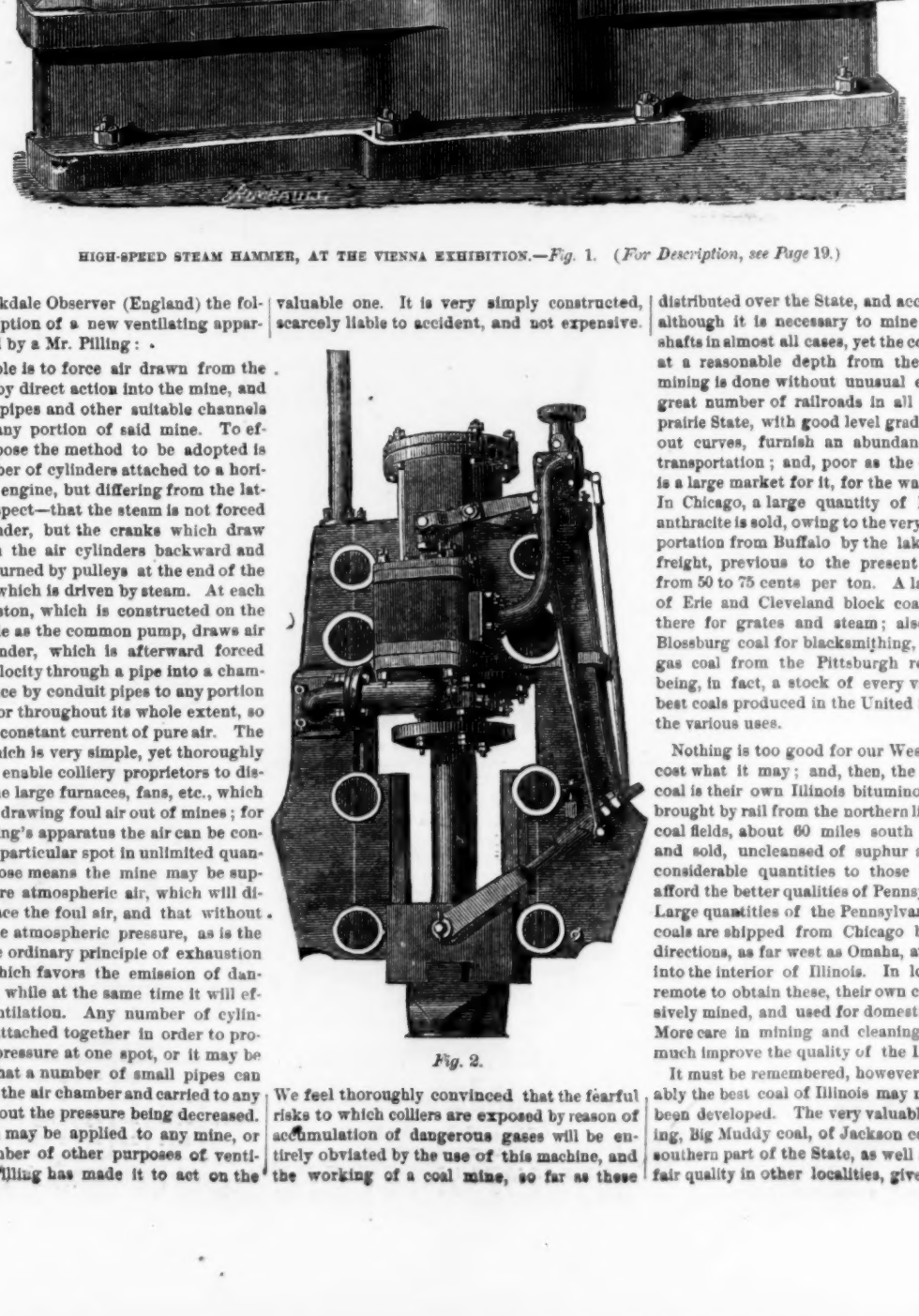
The eight spans composing the bridge are all of iron: Post diagonal truss—outside intersection; top chord, cast iron; bottom chord and ties, wrought iron. The assumed strength of the wrought iron is 60,000 lbs. per square inch; assumed strength of superstructure, 2100 lbs. per lineal foot; assumed weight of moving load, 2500 lbs. lineal foot. All the iron in the bridge is tested to double the estimated strain which it will receive beneath the maximum load; all materials used at a safety factor of 6.

Ventilation in Mines.

As all improvements in this direction bear directly upon our own mining interests, we take from the Rockdale Observer (England) the following description of a new ventilating apparatus invented by a Mr. Pilling:

The principle is to force air drawn from the atmosphere by direct action into the mine, and by means of pipes and other suitable channels convey it to any portion of said mine. To effect this purpose the method to be adopted is to use a number of cylinders attached to a horizontal steam engine, but differing from the latter in this respect—that the steam is not forced into the cylinder, but the cranks which draw the piston in the air cylinders backward and forward are turned by pulleys at the end of the crank shaft, which is driven by steam. At each stroke the piston, which is constructed on the same principle as the common pump, draws air into the cylinder, which is afterward forced with great velocity through a pipe into a chamber, and thence by conduit pipes to any portion of the mine, or throughout its whole extent, so as to cause a constant current of pure air. The invention, which is very simple, yet thoroughly efficient, will enable colliery proprietors to dispense with the large furnaces, fans, etc., which are in use for drawing foul air out of mines; for with Mr. Pilling's apparatus the air can be conveyed to any particular spot in unlimited quantities. By those means the mine may be supplied with pure atmospheric air, which will dilute or misplace the foul air, and that without decreasing the atmospheric pressure, as is the case when the ordinary principle of exhaustion is adopted, which favors the emission of dangerous gases, while at the same time it will effect local ventilation. Any number of cylinders may be attached together in order to produce a large pressure at one spot, or it may be so arranged that a number of small pipes can be coupled to the air chamber and carried to any chamber without the pressure being decreased. The invention may be applied to any mine, or for a vast number of other purposes of ventilation. Mr. Pilling has made it to act on the opposite principle to that usually adopted in ventilating mines, which is by exhaustion, which necessitates a diminution of atmospheric pressure; and it therefore follows that by the present arrangement not only can the ordinary pressure be maintained, but it can be increased to any desired amount, thereby diluting any explosive gas or preventing its issue at low pressure.

The machine promises to be an extremely valuable one. It is very simply constructed, scarcely liable to accident, and not expensive.



HIGH-SPEED STEAM HAMMER, AT THE VIENNA EXHIBITION.—*Fig. 1.* (*For Description, see Page 19.*)

Fig. 2.

We feel thoroughly convinced that the fearful risks to which colliers are exposed by reason of accumulation of dangerous gases will be entirely obviated by the use of this machine, and the working of a coal mine, so far as these causes of accident are concerned, made as safe as any operations above ground.

Coal in Illinois.

Mr. McFarlane, in his interesting work on "The Coal Regions of America," says of the coal veins of Illinois:

The valuable features of the Illinois coal are, that there is plenty of it; that it is very widely distributed over the State, and accessible. For, although it is necessary to mine by means of shafts in almost all cases, yet the coal is reached at a reasonable depth from the surface; its mining is done without unusual expense; the great number of railroads in all parts of this prairie State, with good level grades, and without curves, furnish an abundance of cheap transportation; and, poor as the coal is, there is a large market for it, for the want of better. In Chicago, a large quantity of Pennsylvania anthracite is sold, owing to the very cheap transportation from Buffalo by the lakes, the usual freight, previous to the present year, being from 50 to 75 cents per ton. A large amount of Erie and Cleveland block coal is also sold there for grates and steam; also, they have Blossburg coal for blacksmithing, and the best gas coal from the Pittsburgh region; there being, in fact, a stock of every variety of the best coals produced in the United States for all the various uses.

Nothing is too good for our Western people, cost what it may; and, then, the poor man's coal is their own Illinois bituminous, which is brought by rail from the northern limits of their coal fields, about 60 miles south of Chicago, and sold, uncleansed of suphur and slate, in considerable quantities to those who cannot afford the better qualities of Pennsylvania coal. Large quantities of the Pennsylvania and Ohio coals are shipped from Chicago by rail, in all directions, as far west as Omaha, and far south into the interior of Illinois. In localities too remote to obtain these, their own coal is extensively mined, and used for domestic purposes. More care in mining and cleaning would very much improve the quality of the Illinois coal.

It must be remembered, however, that probably the best coal of Illinois may not yet have been developed. The very valuable iron smelting, Big Muddy coal, of Jackson county, in the southern part of the State, as well as some of a fair quality in other localities, gives us ground for hope of yet finding coal of a better quality than much of that which is now mined. Certainly, a large amount of coal lately developed, in West Indiana, is of a much better quality than the coal of Illinois generally; and as we have no reports as yet of thorough explorations of the counties in the central and eastern part of the State in the vicinity of where the valuable seams of coal on the Indiana side have been discovered, we have reason to expect an extension of them into the eastern part of Illinois. Whatever there may be of value, Western enterprise will develop. The wide distribution and vast extent of the Illinois coal field are truly wonderful. Here coal fields are as inexhaustible as the soil of her fertile prairies.

The United States census of 1870 reports the production of coal in Illinois at 2,629,563 tons. To those accustomed to the very large production of Eastern mines, near our seaboard, or large cities, these figures may appear small, but it should be considered that this is but the infancy of the coal business in the West. Many of the mines have been opened a very short time; the country is quite new, and thinly settled; some of the localities are far in the interior, remote from large towns, and many of the particulars which have been mentioned in this chapter are given more as indicating what we may expect hereafter, than for their present importance.

Lead Prospects in Southwest Missouri.

The Neosho (Mo.) *Times* says:

On lands belonging to J. B. Davis, about four miles east of this place, the lead excitement has broken out afresh. Mr. Davis has been for some time taking out large quantities of lead, while others have been diligently seeking it. In a new shaft, 70 feet deep, lead has been found which promises to be richer and more abundant than any lead heretofore discovered in the Southwest. A number of shafts are being sunk on Mr. Davis' land, and all the indications point to a rich harvest to be reaped there.

At Seneca the prospects are also brightening. The shaft of Sherwood & Bryant is increasing in richness as they go down, and one day last week 500 pounds of fine mineral were taken out. This has aroused a fresh interest in mining matters at that point, and we shall not be surprised to hear of other rich strikes being made there.

At Beef Branch, some twelve miles northwest of this place, a number of hands are at work. On the lands of Mr. Williams a number of shafts are being sunk, in all of which more or less mineral has been found. These lands, we understand, have been leased to Mr. Thompson, a practical miner, who has put in a pump, and will at once proceed to the work of developing them. The whole country is rich in mineral, and we look forward to the day, in the near future, when that will prove to be the richest lead region in the State.

At the Cornwall mines work is progressing. A number of miners were at work, and fair quantities of mineral are being raised.

A shaft is being sunk on Mrs. Burr's farm, near town, from which specimens of lead have been taken.

The International Bridge Finished.—The Buffalo *Commercial* announces that the great International Bridge, crossing the Niagara River at Black Rock, and connecting the United States of America with the Dominion of Canada, is at last completed. The first caisson was launched on the 18th of July, 1870, and work progressed steadily up to the time of completion. The bridge was practically finished this week, by the winding up of work on the last span. The entire cost of the International Bridge, in round numbers, is not less than $1,500,000. Of its practical benefits we leave the reader to judge, merely stating in conclusion that it supplies a want long been felt by the different railroads which have for so many years been obliged to cross the Niagara River on the steamer International. The bridge has been leased to the various railroads which will cross it, for twenty years. The roads are the Grand Trunk, the Great Western, the Canada Southern, the New York Central, the Erie, and the New York, West Shore and Chicago. Most of these railroads have already constructed their approaches to the bridge, and will commence sending trains across at as early a day as possible. A railway track is laid over the bridge, and also a sidewalk for foot-passengers. The original plan contemplated a carriage-way as well, but this was abandoned for the reason that, as the bridge was three-quarters of a mile long, and so many trains were to cross it, there would very seldom be a chance for carriages to cross without interfering with the trains. Hence it was thought best to give up the idea of a carriage-way altogether.

It is said that more iron ore is at present upon the Cleveland docks than ever before at this season of the year.

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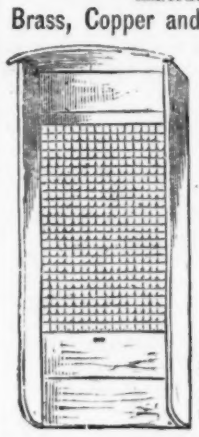

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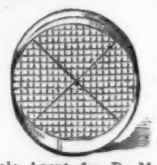

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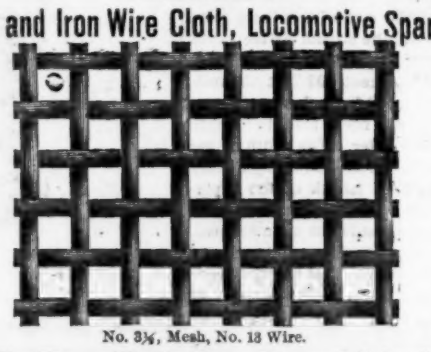

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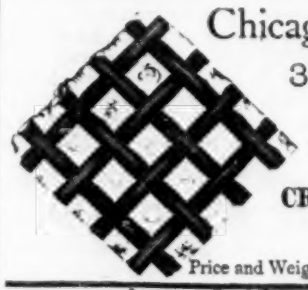

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No of Wire	Wt. per sq. foot	Price cts.	No of Wire	Wt. per sq. foot.	Price cts.	No of Wire	Wt. per sq. foot	Price cts.	No of Wire	Wt. per sq. foot.	Price cts.	No of Wire	Wt. per sq. foot.	Price cts.	No of Wire	Wt. per sq. foot.	Price cts.
10	3.47	40	11	3.20	38	12	2.80	35	14	2.43	33	16	2.00	30	18	1.39	30
11	2.75	32	12	2.45	31	13	2.15	30	15	1.97	30	17	1.47	25	19	1.08	25
12	2.10	26	13	1.85	25	14	1.62	25	16	1.51	25	18	1.11	20	20	0.76	20
13	1.62	22	14	1.41	20	15	1.31	21	17	1.10	20	19	0.85	18			

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RULES IN HYDRAULICS.

Water Power and the Methods of Estimating It—Flow of Water Through Pipes—Lifting Capacity of Pumps.

Mechanical power, or the working force of machinery, is described by "horse-power." The unit or single horse-power is a force that will raise 33,000 pounds one foot high in one minute, or 550 pounds a foot high in one second. The force required to lift a pound one foot high is the unit of measurement, and is called foot-pound. A given weight falling a certain distance gives off in power a force equal to that which raises the same weight through the same distance in the same time.

A cubic foot of water weighs about 62½ pounds, and that quantity has a force of 62½ foot-pounds for each foot of fall. Supposing the whole weight utilized without any loss, 528 cubic feet per minute falling one foot would be equal to one horse-power. For sake of brevity, the foot-pounds per second are used in the calculation of horse-power.

The whole power of a waterfall cannot be possibly utilized; the various hydraulic machines make available from 40 to 90 per cent. of the whole power of the water. When it is known what per cent. of useful effect is derived from the water by any wheel, it is easy to calculate the available power. Thus for 40 per cent. useful effect, the cubic foot of water would give 25 foot pounds for each foot of fall, and would take 22 cubic feet per second for a horse-power; at 90 per cent. 10 cubic feet per second would give a horse-power for each foot of fall, and so on.

The first thing to be ascertained is the quantity of water which is at command. There is a great variety of modes adopted for measuring and estimating the quantity; some convenient without much accuracy; others very nice and accurate, but not always convenient; but as approximations often answer practical purposes, some of the most easy and convenient modes will be stated. We begin with the mode for estimating water in canals or running streams.

Where a stream is straight and of a uniform width and depth for a considerable distance, an approximate, but not very reliable, estimate may be made by multiplying 4-5 of the surface velocity in the middle of the stream (ascertained by means of floats) by a cross section of the stream.

The following is a better rule: Take the square root of the inches a floating body passes over in one second in the middle of the current, subtract it from such surface velocity, add ·5 to the remainder, and it gives the mean average velocity in inches per second; multiply 1-12 of this by the section of the stream in square feet, and it gives the cubic feet per second passing in the stream.

If we let f=fall per mile in inches, a=area of a cross section of the stream, p=the perimeter of the channel in contact with the water, v=mean velocity of the stream, in inches per second,

then $v = 1{\cdot}23 \sqrt{\frac{af}{p}}$ and $\frac{1{\cdot}23}{12} \sqrt{\frac{af}{p}}$

or $0{\cdot}1025\ a \sqrt{\frac{af}{p}}$ = cubic feet per second.

In most cases the best plan, when accuracy of calculation is required, is to procure the services of an expert hydraulic engineer. Rules for making such calculations are useful when one knows how to apply them, but are of limited utility when persons unacquainted with the principle of engineering science attempt to make difficult calculations from them. We give, however, the following rules in hydraulics, which will be found valuable for reference by those using water-power, or raising water with power:

The pressure of water in a vessel or flume depends only upon the perpendicular hight. The pressure of water, in pounds upon every square inch of a flume, or other vessel containing it, is exactly equal to the weight of a column of water an inch square, and extending from the given point vertically to the level of the surface of the water in the cistern. The velocity of water spouting from an orifice under a pressure of a vertical column of water is eight times the square root of the head, or vertical distance below the surface. The quantity of water discharged through an orifice of a given size varies as the square root of the head.

The power varies as the square root of the head multiplied by the head. Theoretically, to ascertain the cubic feet of water per minute that will be discharged through an opening, multiply the area of the opening in feet by the square root of the head, and multiply this product by 8 and then by 60. If the opening be cut in thin metal plate placed perpendicularly to the side of the flume or reservoir, the quantity of water will only be five-eights of the amount given by the preceding rule. The quantity of water which pipes should deliver with water flowing with greatest speed per second, consistent with economical working of the pump, is shown in the following table:

Size of pipe inside.	Gallons per minute. 4 ft. per second.	6 ft. per second.
¼	2·5	3·6
⅜	5·4	8·1
1	9·8	14·6
1¼	15·3	22·9
1½	22·0	33·0
1¾	31·0	46·4
2	39·1	58·7
2¼	49·5	74·3
2½	61·2	91·8
2¾	74·1	101·2
3	88·1	132·1
3½	119·9	179·9
4	156·6	235·0
4½	198·2	297·4
5	244·8	367·2
5½	296·2	444·3
6	352·5	528·7

In practice 4 feet per second is the maximum of economy.

The following table shows the capacity of cisterns in United States gallons, for each 10 inches in depth:

2 feet diameter	19·5	8 feet diameter	313·33
2½ "	30·8	8½ "	353·72
3 "	44·06	9 "	396·56
3½ "	59·97	9½ "	461·40
4 "	78·33	10 "	489 20
4½ "	99·14	11 "	592·40
5 "	122·43	12 "	705·00
5½ "	148·10	13 "	827·4
6 "	176·25	14 "	959·6
6½ "	206·85	15 "	1101·6
7 "	239·88	20 "	1958·4
7½ "	275·40	25 "	3059·9

The following table shows the number of gallons which may be raised per hour or per minute by a duplex, or double pump:

Diameter of Water Plungers in Inches.	Length of Stroke in Inches.	Single Strokes per minute, varying with kind of work and pressure.	Displacement in gallons per single stroke.	Gallons per Hour.
2¾	4	150 to 200	11-100	990
4	6	120 " 160	34-100	2,448
4½	10	120 " 160	72-100	5,084
6	10	100 " 150	1 28-100	7,680
7	10	100 " 150	1 74-100	10,440
10¾	10	100 " 150	3 73-100	22,380
14	10	100 " 150	7	42,000
15	15	100 " 150	11 47-100	68,820

There being two pumps the number of strokes is of course doubled. These tables are calculated for 100 feet head. For greater hights the speed must be reduced.

The following table shows the lifting capacity of steam pumps in proportion to diameter of water cylinder and length of stroke:

Diam. Water Cylinder.	Length of Stroke.	Gals. ℔ Stroke.	Strokes ℔ min.	Gals. ℔ hour
2 inches.	4 inches.	·06	100	360
2½ "	5 "	·10	100	600
3½ "	7 "	·25	100	1,500
3½ "	7 "	·34	100	2,040
4½ "	10 "	·69		1,656
5 "	10 "	·85	40	2,040
6 "	12 "	1·46	to	3,504
7 "	12 "	1·99	60	4,776
8 "	12 "	2·61		4,264
10 "	16 "	5·43		6,516
12 "	24 "	11·75	20	14,100
14 "	24 "	15·99	to	19,188
18 "	24 "	26·43	30	31,716
22 "	24 "	39·49		57,398

This table is computed for 100 feet head. At the speed given a good steam pump should be able to run any length of time.

The Situation at Pittsburgh.

We take the following from the Pittsburgh *Commercial* of November 11:

Greatly exaggerated statements have been given to the public, from time to time, since the beginning of the panic, relative to the depression of business in this city, particularly as regards the iron trade and its branches. Most of these misstatements have found publicity through the newspapers of the East, and we have taken occasion to correct a number of them in our columns. Business here, as elsewhere throughout the country, has been seriously affected by the panic, but not to the extent represented by telegraphic correspondents and letter writers. Some of the assertions printed in leading newspapers have been absurd and ridiculous; as, for instance, that, by the stoppage of our blast furnaces, ten thousand men had been thrown out of employment! Only two out of the eleven furnaces had stopped work, and these ceased because the workmen declined to accept a reduction of ten per cent. in wages. The whole number of men employed, directly, is about sixty to each furnace, and indirectly about forty, including those who handle the fuel, ore, etc. This would give an aggregate of eleven hundred men, all told, of whom but about two hundred are idle. Other statements equally as reckless and devoid of truth, have been published abroad.

THE IRON BUSINESS.

Careful inquiry from persons of intelligence and large experience in the iron business, enables us to give a general review of the situation. Without attempting to disguise the fact that all branches are depressed, nevertheless the outlook is not near so gloomy and discouraging as has been represented. This becomes the more important in view of the fact that it is estimated on reliable authority that our rolling mills, foundries, machine shops, etc., consume about one-forth of the entire pig metal product of the United States. In the various branches of iron manufacture we usually give employment to upward of sixteen thousand hands. What proportion of these are now idle is not accurately known; but it is reasonably certain that the stoppage is only temporary. The market for our iron product is mainly in the South and West, and, owing to the scarcity of money, Western and Southern customers have largely curtailed their orders. The railroad companies are very heavy customers, and they have been compelled to "rub along" as best they can, until money becomes easier. Their machinery, however, is subject to the same wear and tear as if there were no retrenchment; indeed, the wear is even greater where repairs are not promptly supplied; so that, ere long, orders must begin to come in from this class of customers. The tightness of the money market has compelled the most rigid economy, and hence it is that orders have fallen off, so that none of our mills are able to run full time with a full complement of hands. At a time like this, it would be folly in our mill owners to stock their warehouses with manufactured goods, and, like prudent men, they are running merely to supply the demand. In times of general prosperity, such as we have had until recently, there is a tendency to accumulate stocks ahead, and when the crash came, there were considerable supplies on hand, in several branches, which have not yet been used up. These will soon be cleaned up, and then a gradual improvement will begin to take place. The degree of this improvement will be measured by the condition of the currency. There is another reason why many of our rolling mills do not manufacture stocks ahead. For several years past there has been marked changes in the demand for some articles—as, for instance, plate iron. It has, of late, become the practice to order plates according to specifications, in regard to length, breadth and thickness, so that the manufacturer is no longer able to anticipate the wants of his customers. The same rule now holds in regard to merchant bar and other iron; so that the mill owner, even if he had the means and the disposition to stock, could not do so economically, as to a large class of articles, any more than a house builder could provide in advance of any plans or specifications, the materials that are to go into a dwelling or warehouse.

OUR BLAST FURNACES.

In regard to our blast furnaces, it is only necessary to state that, while but two of them have stopped for the present, the price of pig metal has become so depressed that there is no margin of profit in its manufacture, at the present prices of ore. Both ore and fuel have ruled high. It has been the custom of the trade to make contracts for ore for the year, and this circumstance has tended greatly to embarrass our furnace companies. The prices for ore the present year have been largely in excess of those of any previous season, and a reduction is regarded by furnace men as an inevitable necessity, before new contracts are entered into. It is proper to state, however, that more than one-half of our furnaces are carried on in connection with rolling mills, and owned by the same parties, so that these are not compelled to throw their product upon the market.

Our Merchant Navy.—The portion of the forthcoming report of the Register of the Treasury, which refers to the American merchant marine, is of general interest. It appears that on the 30th of last June there were altogether 32,672 American vessels, with 4,696,026 tonnage, an increase, as compared with the close of the previous fiscal year, of 19,493 tonnage in the foreign trade and 238,668 tonnage in the coastwise trade. This country, at the date mentioned, owned 2,383,801 tons of sailing vessels, 1,156,443 tons of steam vessels and 1,155,782 tons of canal boats and barges, three-fifths of the year's increase having been in the latter class. Of the steam tonnage reported, about one-sixth is employed in the foreign trade of the country. During the fiscal year just closed shipbuilding received a great impetus, there having been built 2271 vessels, with 359,246 tonnage, an increase of over 150,000 tons compared with the preceding year. This great increase, the Register attributes to the serious losses to our merchant shipping by wrecks, and the fact that, owing to advances in the prices of labor and materials abroad, the cost of American built ships is now but slightly greater than the best English vessels. The tonnage built during the last fiscal year was 144,629 of sailing vessels, 88,011 of steam vessels, and 126,606 of canal boats and barges. Twenty-six iron vessels were built during the year, aggregating 26,528 tons, an amount about equal to the iron steam tonnage built during the two previous years combined. Three of these vessels were of the largest class, the steamers of our Philadelphia company, intended for foreign trade. There are 2640 American vessels, with 154,274 tonnage, employed in the fisheries and owned chiefly in New England. Of these, the cod and mackerel fishermen are constantly increasing, whilst the whalers as regularly decline. Thus, there are 187 whale ships, with 44,755 tonnage, registered this year, whilst last year there was 51,608 tonnage engaged in the whale fisheries.

Report of Inspections Made by the Hartford Steam Boiler Inspection and Insurance Co., for September, 1873.—The number of visits made during the month was 1465; boilers examined, 2858; internal examinations, 792; external, 2738. The hydraulic pressure was applied in 236 cases. Total number of defects discovered was 1199, of which 287 were regarded as dangerous. The defects were as follows: Furnaces out of shape, 46—11 dangerous. Fractures, 110—43 dangerous. Burned plates, 67—25 dangerous. Several of these cases resulted from the neglect of the fireman to try the gauge cocks before starting fire in the morning. The boilers were blown down Saturday night and then refilled; but the blow-off cock did not close tight, or a defect in the check valve in the feed-water pipe allowed the water to run out of the boiler before Monday morning. The red hot, warped and twisted plates soon gave notice of the situation. Blistered plates, 202—28 dangerous. Deposit of sediment, 223—27 dangerous. Incrustation and scale, 210—24 dangerous. External corrosion, 70—14 dangerous. Internal corrosion, 34—14 dangerous. Internal grooving, 12—6 dangerous. Water gauges defective, 79—14 dangerous. Blow-out defective, 26—11 dangerous. Safety valve overloaded, 43—15 dangerous. Pressure gauges defective, 189—24 dangerous; errors ranging from −44 to × 7 pounds. Boilers without gauges, 61—8 dangerous. Deficiency of water, 5—3 dangerous. Braces and stays broken, 54—19 dangerous. Boilers condemned as unsafe to use, 8.

An English gentleman has recently discovered, near the Wells of Moses, by the Red Sea, the remains of iron works so vast that they must have employed thousands of workmen. Near the works are to be seen the ruins of a temple, and barracks for the soldiers protecting or keeping the workmen in order. These works are supposed to be at least three thousand years old.

Two nickel furnaces are in process of erection in Madison county, Mo. The tin mining company have erected a furnace at a cost of $150,000. One copper mine is being worked and four iron banks. Over half a million dollars' worth of nickel has been shipped within the last three years. This county excels any spot in the world for the number and wealth of its mines.

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New Patents.

We take from the records of the patent office at Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN CUPOLA AND OTHER FURNACES.

Specification forming part of Letters Patent No. 143,463, dated Oct. 7, 1873, issued to Lois Quincke, of Joliet, Illinois.

The object of this invention consists in the combination of certain devices, by means of which a hot air blast is blown into the cupola at three or more points.

In the drawings, Figure 1 is a plan view on the top of invention; Fig. 2, a vertical section through the center of the fan and hot air furnace; Fig. 3, a vertical section through the center of the wind gauge; and Fig. 4, a cross sectional view of the said wind gauge or pressure gauge.

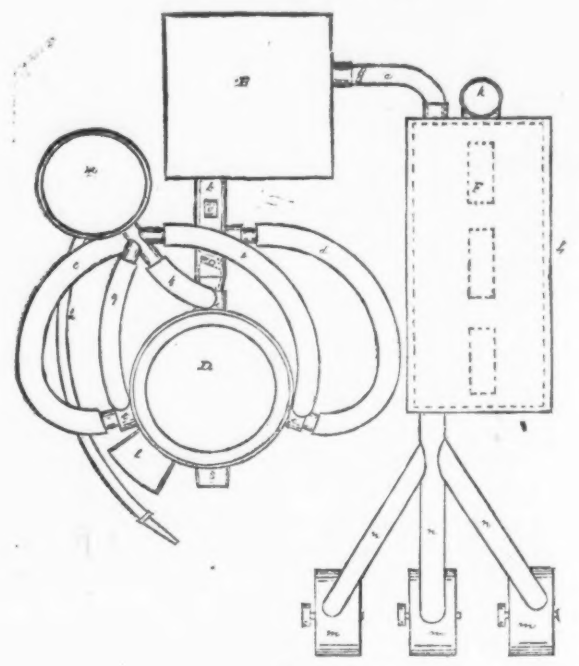

Fig. 1.

The mode of operation and description of the construction of my device will be readily understood by a reference to said figures. In Fig. 1 the several principal portions of the device, consisting of the cupola D, water tank W, wind box or receiver B, and hot air furnace F, and fans *m*, appear in combination, and connected together by means of connecting pipes *a*, *b*, *c*, *d*, as shown, ready for work; the water tank W furnishing water through the pipes *e*, *f*, *g*, to cool the tuyeres *t*, as will be hereinafter more particularly set forth.

Fig. 2 is a detached longitudinal and vertical sectional view of the hot air furnace or retort F inclosed in its case C, and connected to or with the fans *m* by means of the pipes *n*. These fans are shown three in number in Fig. 1, but may be of any number. A blast of cold air is forced into the furnace or retort F by means of the fan *m*, from whence it passes heated to the wind box or receiver B, and thence to the cupola through the pipes *b*, *c*, *d*, discharging into the same at three equidistant points at its sides, through the double conic tuyeres *t*, as shown, the air becoming thoroughly heated in passing through said retort or hot air furnace F.

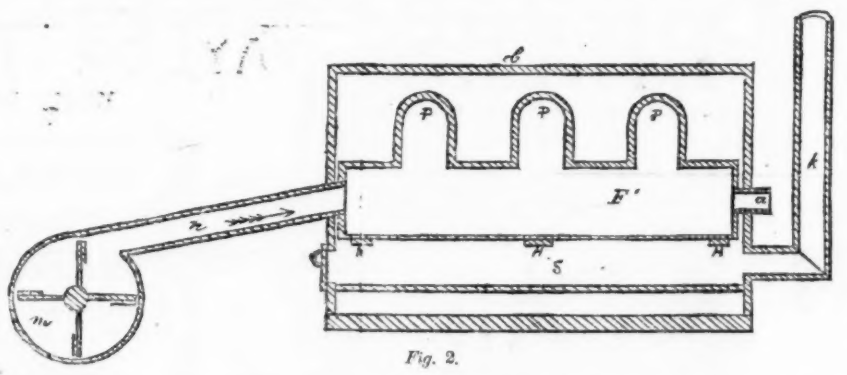

Fig. 2.

The conical projections P, P, P, Fig. 2, are attached to the hot air retort simply to give more heating surface thereto. The use of the wind box or receiver B is for the purpose of holding a volume of compressed air, so as to take the advantage of its elasticity, so a uniform, steady current of air will discharge into the cupola therefrom.

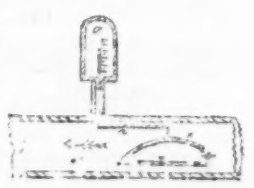

Fig. 3.

Fig. 4.

The tuyeres are double hollow cones, or may be a single cone, with opening at the top and bottom intended for the entrance and discharge of water from the tank W to keep them cool.

For the purpose of measuring the pressure and velocity of the hot air blast into the cupola, the device shown in Figs. 3 and 4, and at *o*, Fig. 1, is used. Figs. 3 and 4 show more particularly the construction and operation of the device which is situated in the pipe *b*. *z* is a flat strip of metal, having a curved cover of wood, one edge, or the rear edge, being attached to the rear edge of the strip or floor *z*, leaving the front end open at *v*. This device rests on the bottom of the interior of the pipe *b* at its sides, as shown in Fig. 4, leaving a passage for the air all around it. As the air passes a blast is forced into the opening at its front end at *v*, which has the effect of raising the device up, so the wire or rod *r* attached to the top thereof may indicate the amount of pressure and the velocity of the air on a scale shown on the face *o*.

The mode of heating the hot air furnace or retort F is by fire in the furnace beneath *s*. The same is supported in its case C on bars H, or other supports, in such a manner that it may be entirely free from the case C, so the fire may pass entirely around it. *k* being the chimney or smoke stack for the escape of the smoke. *h* is a hose, connected to the water tank W, the use of which is to cool off the metal after its discharge from the cupola into a cooling pan of the ordinary pattern.

Claim.—The wind gauge described, consisting of the combination and arrangement of the parts *z*, *x*, *r*, *o*, and pipe *b*.

IMPROVEMENT IN WELDING IRON AND STEEL.

Specification forming part of Letters Patent No 142,939, dated September 16, 1873, issued to Joseph Popping, of New York.

The object of this invention is to combine iron and steel; and it consists in making a compound of borax and iron filings to be used for the purpose, and in the process of applying the same.

In carrying out the invention take hard borax and melt it in an iron pan over fire. When perfectly melted, let it get cold. Then crush it to powder. Then mix one part in weight of this powder with one part in weight of clear filings of iron. Then take the pieces to be combined; warm one of them slightly, so that the mixture will stick to it; then, both pieces being in iron-clean condition, sprinkle the warm piece with the mixture till it is fairly covered; then place the other piece on this covering, and, while the two pieces are firmly held together, heat them red hot and then hammer them well together.

The compound more firmly unites the two metals, so that they form one solid body, which cannot again be separated into its original parts; and this process, further, makes a combination which preserves, in a greater degree than could otherwise be done, the original hardness and tenacity of the steel, because not heated to so high a degree, and at the same time a combination which, by the connection of the two pieces, strengthens them and prevents all possibility of break.

Claim.—1. The above described welding compound, consisting of calcined borax and iron filings.

2. The process of uniting iron and steel by first heating one or more pieces of metal slightly, applying the compound, joining the two metals and subjecting them to a red heat, and hammering or rolling them together.

IMPROVEMENT IN BLAST AND CUPOLA FURNACES.

Specification forming part of Letters Patent No. 139,891, dated June 17, 1873, issued to David W. Hendrickson, of Red Bank, New Jersey:

This invention relates to that class of furnaces operated by the steam jet power or principle, with any kind of fuel desirable. Its object is economy and simplicity of both construction and operation of furnaces for melting or smelting ores and metallic substances, with better results and quality of product, and a cheaper and easier mode of feeding the furnace, and by means of injectors to secure a greater or additional heat in the lower part of the furnace, whereby a hydrocarbon blast or a compound blast may be obtained, when the steam coming through pipe, E, comes in contact with the fire from stove, D, which superheats the steam, eliminating the hydrogen, which combines with the carbon of the fuel in the stoves, which, by force of the steam and the natural draft of the furnace, blast is conducted into the furnace as a hydrocarbon blast, the steam and fire commingling in tuyeres, F, F', F'', F''', before entering furnace, A, Fig. 1.

The feeding is accomplished by throwing, alternately, the charge, fuel, ores or material into the concave hopper, P, and around the bell, or cone, C; then, by lowering the cone, C, and stack, Q, by means of lifting weights, O, O', operated by pulleys, or wheels, J, J', it discharges the charge into the furnace, A, Fig. 1, in an even and regular manner around the outer edge or interior of the furnace, A. The blast and draft are obtained in a more powerful and more intense manner by the operation of steam

Fig. 1.

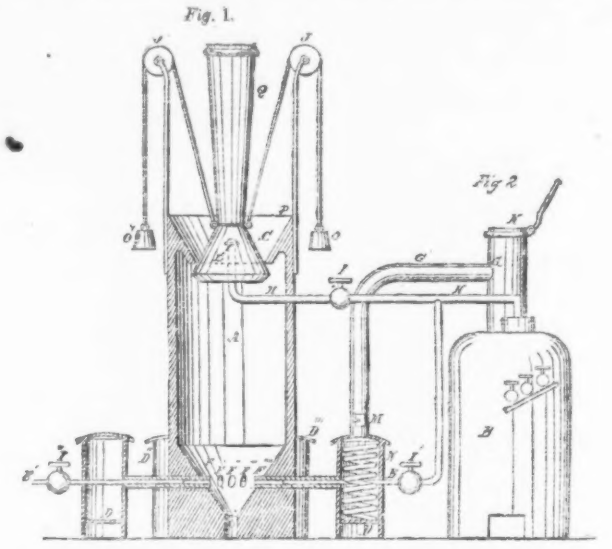

Fig 2

IMPROVED BLAST AND CUPOLA FURNACE.

cocks, I, I', I''. The upper cock, I, admits the steam from tank, or boiler, B, Fig. 2, through pipes, H, H, to nozzle, L, where it escapes through bell, C, and stack, Q, thereby forming a partial vacuum in furnace, A, Fig. 1, causing a very powerful draft, which is supplied by tuyeres, F, F', F'', F''', F'''', with air, fire, steam, or a compound blast of fire and steam. The blast is procured or produced by steam cocks, I', I'', which admit steam or water from tank, or boiler, B, Fig. 2, through pipe, H, to cocks, I', I'', thence through pipe, E, and coil, N, through tuyeres, F, F', F'', F''', F'''', into the bosh, or crucible, of furnace, A, Fig. 1, the same passing through stoves, D, D', D'', D''', whereby the steam becomes superheated, or the water becomes steam by passing through coil, N. The hot blast is obtained by one or more stoves, D, D', D'', D''', arranged around the outside of the furnace, filled with coke, coal, or any fuel it may be desirable to use. The fire and heat from the same is injected into the furnace, A, through tuyeres, F, F', F'', F''', F''''. The chimney, G', G, provided with damper, K, operates as a chimney for draft for the boiler, or as a conduit to conduct the smoke and heat from under the boiler to stove, D, whereby it is consumed as fuel and saved, beside adding to the fuel in the furnace.

Figure 1, letter A, is the interior view of a blast or cupola furnace arranged with tuyere holes, F, F', F'', F''', F'''', crucible and tap hole made of boiler iron, and lined with fire clay or brick in the usual way, with an open hopper top. Fig. 2, letter B, is a steam boiler or water tank, built in any desirable shape or size, of iron or wood, having iron pipe connections, H, H, and operated with steam cocks or valves, I, I', I''.

Q and C represent a combined iron stack and perforated bell feeder operated by wheels, J, J', and weights, O, O', for feeding furnace, A, Fig. 1. D, D', D'', D''' are stoves made of iron for holding and consuming fuel, coke, charcoal, oil, petroleum, wood, coal, or any desirable fuel, for either heating steam or water, and for causing more or additional heat and fire for the furnace, in combination with pipes, E, E', which inject the same into furnace, A, and there become combined with the steam or water, causing a more intense and powerful heat, as shown, and operated in the accompanying drawing.

Claim—1. The combination of furnace, A, adjustable and combined stack, Q, and bell, C, as a feeder with hopper, P, steam pipes, H, H, nozzle, L, tuyeres, F, F', F'', F''', F'''', stoves, D, D', D'', D''', cocks, I, I', I'', pipes, E, E', coil, N, chimney, G', G, damper, K, and boiler, or tank, B, Fig. 2.

2. The stack, Q, and perforated bell, C, combined for the feeding of furnaces.

3. The combination of tuyeres, F, F', F'', F''', and injector pipe, E, with stove, D.

IMPROVEMENT IN THE MANUFACTURE OF CAST IRON FROM ORE.

Specifications forming part of Letters Patent No. 143,350, dated September 30, 1873, issued to Pierre E. Jay, of St. Jean Baptiste, Canada.

This invention has reference to further improvements on a certain process for smelting iron ore and flux used therein for which Letters Patent of the United States, No. 134,289, were granted to the inventor on the 24th day of December, A. D. 1872; and consists in treating the iron ore, before being placed in the cupola or furnace, by immersing it in a bath containing a solution of certain substances, or by otherwise thoroughly wetting it with the said solution. These substances are those which have the greatest affinity to carbon, and so the ore thus dipped into or wetted by the solution is enabled to absorb the carbon contained in the flux, and the operation of smelting is performed in a fraction of the time at present usually required for that purpose.

The solution above referred to is prepared as follows: In ten gallons of water dissolve two pounds of sugar. Add two pounds of nitrate of soda, and two pounds of carbonate of lime. Let it stand eight hours, and the mixture is then ready to use.

These proportions will be observed whatever may be the quantity of the solution prepared.

The ore thus dipped in the solution is placed in the cupola with the flux above mentioned, and described in my former patent, and, the blast being turned on, as described, the operation of fluxing the ore is performed in from fifteen to twenty minutes.

Claim.—The treatment of iron ore, before being placed in the cupola or furnace, by wetting it with a solution composed of sugar, nitrate of soda, carbonate of lime, and water, in the proportions specified.

Calumet and Hecla.—The Portage Lake *Mining Gazette* says: It has been decided by the Calumet and Hecla Mining Company to reduce the price of labor, both upon the surface and underground, 10 per cent., and the order took effect on the 1st instant. The men seem well aware of the circumstances which dictate this policy on the part of the company, and, we believe, without an exception, cheerfully accept the situation, willing to share a measure of the loss caused by the present financial difficulties threatening the country and the reduced price of copper. The new engine and boiler house is nearly complete, and the machinery in it will start in about a week. The building is of stone 120x66 feet in size, with iron roof, ceiling and girders, making it fire-proof, and contains eight boilers, with two flues, each 4½x27, two engines with cylinders 24x48 inches, all made at the Delamater Iron Works, New York. This power is expected to take the place of that furnished by three smaller engines, and is intended for hoisting from four shafts, as well as run the air compressor while working the mine to a depth of 2800 feet. At present No. 1 shaft is being worked at the 100 fathom level, No. 2 at the 110, No. 3 at the 100, and No. 4 at the 80. At the assay office of the company Mr. Bolton receives daily samples from the stamp mills of the ragging, boxing and tailings, which are carefully assayed, and show very close comparison with those of both the Detroit and Portage Lake smelting works' assays, the average percentage of ingot copper in the mineral being 84 per cent.

The same journal says: We have entered upon the last month of the business year up here, and never in the history of Lake Superior were the copper mines on so substantial and prosperous a basis, so far as wealth of metal is concerned, as they are to-day. Appreciating this fact, we cannot help reminding those who have money to invest in mining securities that a reasonable profit is sure to result from the purchase of the shares of any of the prominent mines of this or the Keweenaw district at the prices they are selling for at this time.

How to Harden Steel Drills.—It is not generally known that steel can be made so hard that it will pierce any known substance but a diamond. Many jewelers and lapidaries have great trouble in getting the points of their drills hard enough to pierce an amethyst. For the benefit of miners and others using drills that require a hard point we recommend the following manner of manipulation: The drills should be held, if small, by hot pinchers or tongues while tempering. First heat the tool to a white heat, and then press it into a stick of sealing-wax; leave it but a second there and then stick it into the wax in another place. This operation is rapidly repeated until the graver is too cool to enter the wax. In turning or drilling, the tool is moistened with oil of turpentine.

Lake Superior Iron Ore Shipments.—The Marquette *Mining Journal* of the 8th instant says: Half a dozen cargoes will complete the season's shipments from this port for the season. Only a few of the mines are shipping by lake, though most of the older mines are sending ore to the local furnaces. The Keystone has sold a thousand tons to be shipped to Duluth by the steamer Manistee, and will probably send away the last cargo of the season. The total shipments of ore and pig metal from the district up the 5th inst., foots up to 1,099,033 gross tons. Shipments yet to be made, together with the ore sent to coal furnaces, will swell the aggregate production to not less than 1,200,000 gross tons.

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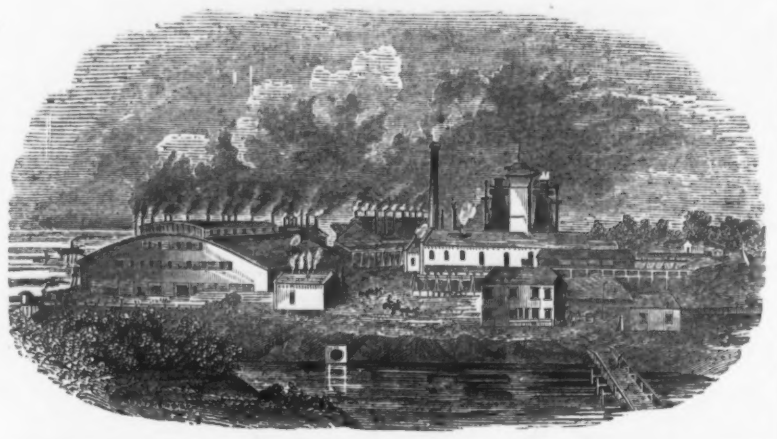

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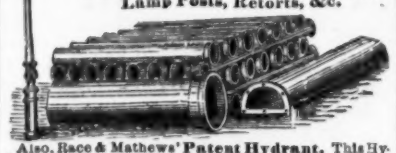

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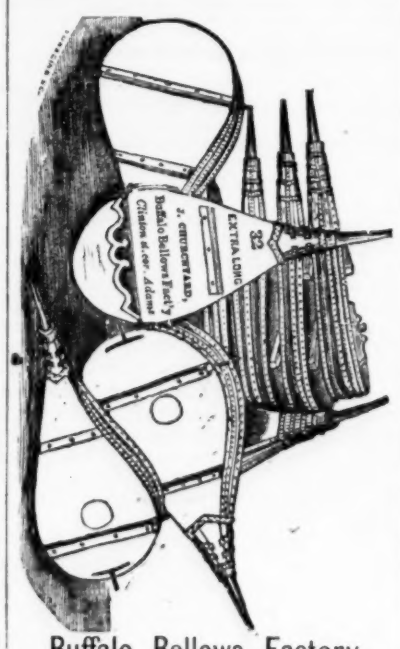

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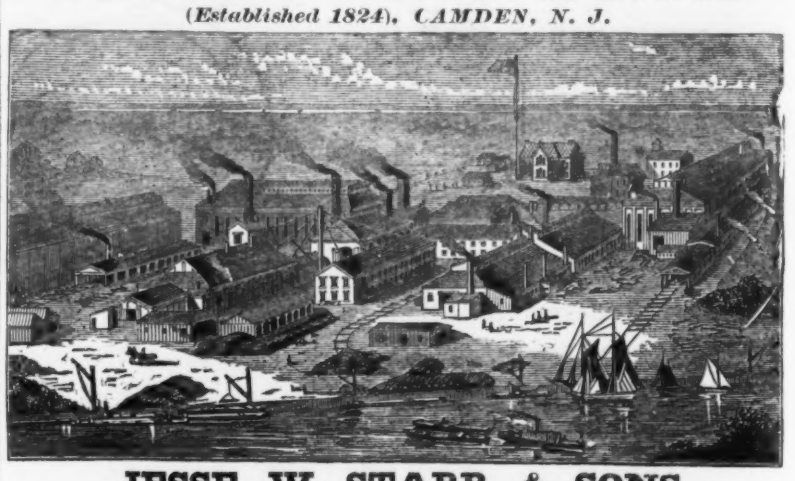

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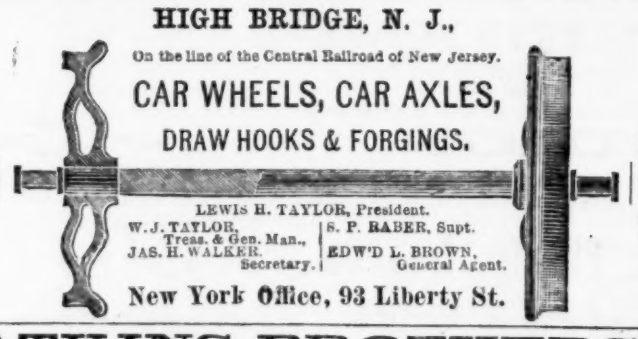

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SWEDISH IRON.

The Nature and Chemical Constitution of Swedish Ores—Calcination—Swedish Blast Furnaces—Refining and Rolling.

The acknowledged superiority of Swedish iron over that hitherto produced elsewhere for steel making, and other purposes where strength, ductility and tenacity are required, has naturally attracted the attention and awakened the interest of metallurgists and others. Inquiries have been instituted as to the qualities and constituents of the ores, the methods adopted for separating the iron from the minerals with which it is always found associated, and the processes by which it is converted into malleable bars for the market. The principal ores have been subjected to careful analyses, and detailed accounts have been given of the various processes in operation for producing the pure iron of commerce—the methods adopted for calcination, the construction and capacity of the smelting furnaces, and the various kinds of forges employed in the fining processes.

The inquiry is one of especial interest to American iron masters, inasmuch as there are on this continent, and within our own domains, ores that in no essential respects differ from those used in the production of the best Swedish irons, and which it is reasonable to assume would yield metal of equally good quality if treated through all the stages of manufacture with the same care and by the same methods.

In placing before our readers the results of the latest investigations on the subject of Swedish iron manufacture, it is necessary that attention should, in the first instance, be directed to nature, qualities and composition of the ores used, and the conditions under which they are found to exist.

THE SWEDISH IRON ORES.

There are three kinds of ores employed in the production of iron in Sweden—magnetic oxide, red oxide, and brown, or lake and bog ores.

The magnetic oxide is the most widely diffused and the most largely consumed. It occurs in veins of crystalline and metamorphic rock, such as quartzite, granite, gneiss, mica schist, &c., and may be associated with quartz, garnet, epidote, hornblende, augite, carbonate of lime, &c., and with from six to ten per cent. of protoxide of manganese or more. Some varieties require no flux, yielding a fusible slag *per se*, when the different ores are mixed in due proportion. The ores of Dannemora, Persberg and Langshytta are of this character; they contain from 50 to 59 per cent. of iron. At the last named furnaces the charge, with the addition of 3 to 5 per cent. of limestone, or blast furnace slag, contains at times as much as 60½ per cent. of iron. The qualities of these ores are much influenced by the nature of the matrix. The best do not contain an appreciable amount of phosphorus, and it is the absence of this injurious element which especially determines their value. Iron pyrites are occasionally present, and are found in sensible proportion, even in some ores of the highest repute—the Dannemora, for example—but as the sulphur is always expelled by careful calcination it produces no injurious effect. In the mines the ore is very commonly intersected by small strings of chlorite called skolar, and iron pyrites are sometimes interspersed in small patches in the neighborhood of some intrusive rock, such as granite. Sometimes the center of a mass may be pure magnetite, passing at either side into copper and iron pyrites. The texture of massive magnetite appears to vary with the containing rock, the most compact, having sometimes a nearly conchoidal fracture, are found in talchose schist, while the more granular and crystalline conditions prevail in hornblendic, gneiss and crystalline limestones.

Probably the largest deposit of iron ore in Europe is that of Gellivara, in Swedish Lapland. It forms a bold hill, rising out of swampy ground, made up of a great number of parallel interlaminations of magnetic and specular iron ores, with hornblendic and quartzose rocks. Several of these are between 100 and 200 feet in thickness. Iron pyrites appear to be almost entirely absent. The following analyses of Gellivara ores are by Rinman:

	I.	II.	III.	IV.
Silica	2·10	3·20	3·10	5·95
Alumina	0·70	0·85	0·85	1·05
Lime	2·10	0·45	2 35	2·40
Magnesia	0·70	1·30	0·60	2·50
Glucina	..	..	0·10	..
Magnetic oxide of iron	92·10	93·45	90·65	87·80
Phosphoric acid	1·70	0·45	1·17	0·09
	99·40	99·70	98·82	99·79
Metallic iron	67·3	67·7	65·6	63·5

The ore of Dannemora, which is specially employed for producing the highest class of steel iron, is a very fine grained magnetite, occurring in an irregular interrupted belt about one and a half miles long, in crystalline limestone and petrosilex, and gives on examination the following analyses:

Analysis.	I.	II.	III.
Peroxide of iron	27·55	28·42	27·50
Protoxide of iron	58·93	62·06	56·80
Protoxide of manganese	·10	....	·24
Lime	·38	trace.	1·80
Magnesia	·61	1·44	·80
Alumina	·29	....	....
Sulphur	·04	·07	....
Carbonic acid	·12	....	....
Water	·11	....	....
Silica	12·51	7·60	13·20
Phosphoric acid	trace.	....	....
	100·67	99·59	100·34
Metallic iron	62·6	65·6	61·16

Analysis No. 1, of Dannemora, by Ward, is of a compact black mineral, containing a very small trace of iron pyrites. No. II, from Hocksta mine, is coarsely crystalline and very slightly coherent, breaking up into sand when subjected to pressure. No. III, from Sladdero, is very remarkable for its regular structure, being divided by joints into rhomboidal prisms.

The red oxide is in the state of hard, compact, specular iron ore, and occurs in veins, in quartzose and granitic rocks, but never in limestone. The matrix is generally highly siliceous from the presence of free silica. This kind of ore is scarcely less abundant than the magnetic oxide, and yields good iron. It is found, among other places, at Dalkersberg, near Nora, and in the island of Uto, in both places associated with magnetite. The Nora ore is made up of parallel strips of a very brilliant micaceous hematite and quartz. Both the magnetic and red oxide ores are often smelted together, and it is from them that most of the malleable iron made in Sweden is taken. The most important iron mines in Sweden may, with reference to the quality of the ores, be placed in the following order: Dannemora, Persberg, Bisperg, Nora, Norberg and Taberg.

The brown, or lake and bog iron ores, are found chiefly in the lakes and streams in the province of Smaland. They are obtained by dredging, and the work of collecting them is confined to the winter months. The raising is effected by a perforated iron shovel fixed to the end of a long pole, which is lowered through a hole, about three feet in diameter, made for the purpose in the ice. It occurs in granular concretionary forms, varying in size from that of grains of coarse gunpowder up to cakes of 6 inches in diameter, and its varieties are designated according to the resemblance of its particles to certain familiar objects. There are as many as five varieties described, viz.:

1st. Pearl ore, which occurs chiefly on clayey or muddy bottoms, and yields about 45 per cent. of iron.

2d. Bur ore, found on grassy bottoms, and which gives about 30 per cent. of iron.

3d. Money ore, which yields about 40 per cent. of iron, and is more dense in structure than the previous two.

4th. Cake ore, considered very poor, yielding only 25 per cent. of iron, found in round cakes, 2 to 6 inches in diameter, on gravelly and clay bottoms.

5th. Gunpowder ore, which yields when pure 50 per cent. of iron, well adapted for casting. It rests on a bottom of fine sand, from which it is sometimes very difficult to separate the ore after it has been taken from the lake.

Lake ores are always more or less intermixed with impurities, of which the chief is sand, sometimes to the extent of 30 or 40 per cent. They contain 20 to 60 per cent. of sesquioxide of iron, and protoxides of iron and manganese, sometimes as much as 10 per cent. of silica, from 0·05 to 4 per cent. of phosphoric acid, and from 7 to 30 per cent. of hygroscopic water. At one place lake ore is found which contains 20 per cent. of manganese. The following is an analysis of lake ore from Flaten, by Svanberg:

Peroxide of iron	67·59
Oxide of manganese	1·45
Silica	7·81
Alumina	4·18
Lime	·47
Magnesia	·23
Phosphoric acid	·18
Water and organic matter	17·81
	99·72
Metallic iron	47·32

These ores are universally found in the neighborhood of reed banks and on the slopes of the shallows in the larger and deeper lakes, in layers of 10 to 200 yards in length, from 5 to 15 yards in breadth, and from 8 to 30 inches in thickness. The same variety is never met with throughout the whole stream; thus, as a rule, gunpowder ore will be found at the beginning, then pearl ore, and lastly money and cake ore. These ores are continually forming, and localities that have been exhausted have been known to present fresh workable deposits of several inches thick after a lapse of 26 years. The formation of them is said to be mainly due to infusorial agency, the iron being derived either from the oxidation of iron pyrites, or silicates of protoxide of iron, such as hornblende, pyroxene, etc., in the adjacent rocks.

CALCINATION OF THE ORES.

The lake and bog ores of Sweden are never calcined previous to smelting, but all magnetic and red oxide ores are subjected to calcination. It is even resorted to in the case of those ores when they contain no appreciable quantity of sulphur, as experience has proved that otherwise they cannot be smelted in a satisfactory manner. It has been supposed, as the cause of this, that the change, in the case of such ores as are free from sulphur, may be merely mechanical, and might depend on the formation of minute fissures in the ore, whereby permeation by the reducing gas of the furnace would be facilitated. The calcining furnace now generally in use is called the Westman furnace, from the name of the inventor. It consists of a vertical furnace which is heated by a portion of the gas drawn from the blast furnaces themselves, and introduced at the bottom of the roasting furnace through suitable flues by the aid of a natural draught. The temperature is carried to such a degree as to soften the ore, which is previously prepared by being broken into lumps not larger than the double fist, and to drive off the sulphuric acid arising from the oxidation of a portion of the sulphur, disengaged by a distillation of a lower temperature from the pyrites which may be mixed with the ore; a portion, moreover, of the sulphur is oxidized by the oxygen of the ore. Ores calcined by this method, however dense when charged into the roasting furnace, are discharged at the bottom quite porous, like a sponge, and almost entirely free from sulphur, if they do not contain more than 4 per cent. in their natural state. With ore so treated, the blast furnace runs with much greater regularity, and with less consumption of fuel than if they were prepared in the common kiln.

SMELTING FURNACES.

The general dimensions of the Swedish blast furnaces are from 8 to 9 feet across the boshes, and from 40 to 50 feet high; the fire hearth is usually small and narrow. The largest at Sandviken, near Gefle, is 52 feet high, 9½ feet wide at the boshes, and 6 feet at the throat, with six tuyeres, four of which are used at one time, the other two being in tymp. The slags and metal are drawn on opposite sides of the hearth. The clay and quartz lining of the hearth is from 6 to 8 inches in thickness; it consists of from 4 to 6 parts of quartz mixed with one part of fine clay.

The temperature at which the blast is driven is from 150° to 200°, Centigrade, the pressure varying from 10 to 15 lines of mercury, or, at most, 20—in the newer furnaces. The gases for heating the blast are drawn through an opening in the side of the furnace, about 12 or 14 feet below the throat. The stoves are of the horizontal serpentine pattern, with pipes of circular section, the coil rarely containing more than three or four turns. They are mostly modelled on what is called the Wasseralfingen stove. The average produce is about 70 tons a week.

Charcoal is the fuel used exclusively for the manufacture of Swedish iron. The only flux employed for the magnetic and red oxide ores is limestone, and it is sometimes added to the extent of 30 per cent. of the weight of the ores, but usually the proportion ranges from 10 to 15 per cent. As a general rule, the more quartzose hematites and micaceous ores are mixed with calcareous magnetites and fluxed with dolomitic limestones. In smelting the silicious itabirite of Nora, 25 per cent. of limestone is used, and at Taberg, where the ore is a greenstone impregnated with magnetite, the charge contains only 20 per cent.

The average yield of the ores is 50 per cent. The consumption of charcoal varies with the nature of the ore, the average for the whole country being from 16 to 17 cwt. per ton of white or mottled forge pig, and about one-third more—or from 21 to 22 cwt.—per ton of gray metal.

The charging of the furnace is most carefully attended to, and absolute uniformity in the size of the pieces of ore is insisted upon. After undergoing calcination, the ore is crushed between rollers into pieces less than an inch square, and from 30 to 40 cubic feet are charged at a time. The ore is carefully distributed on the top of the charcoal in the furnace, the richer magnetites being placed in a ring close to the wall, while the more silicious hematites and specular ores are placed in the middle. The charge usually contains about equal parts of each kind. The limestone, in pieces of the same size as the ore, it being crushed in the same mill, is spread evenly over the surface of the latter. The charges are first weighed in a large wrought iron scoop, and then run on a suspended railway to the tunnel head of the furnace, which is never closed. The hot blast is used universally in Sweden now, with the exception of the furnaces at Finsburg, where cast iron for ordnance is produced, at which the cold blast is still in operation. Even at Dannemora the furnaces are now worked with a blast heated to 80° or 100°.

The furnaces are usually tapped at intervals of about six hours, and the metal is run into iron molds, and not into sand.

The following is an analysis of pig iron, smelted at Langshytta, from magnetite and specular schist:

Carbon	2·50
Silicon	·10
Manganese	·10
Sulphur	·04
Phosphorus	·11
Iron	97·09

The lake ores occur naturally in so finely divided a condition as not to require any mechanical preparation for smelting, but the bog ores, when in lumps, are broken with a hand hammer into pieces of the same size as in the case of the magnetic and red oxides. These ores are never calcined, and, generally, no flux is needed; but sometimes, when much silica is present, a flux is added of from one to three per cent. of limestone, or, as in some localities limestone is very scarce and expensive, a variety of hornblende, rich in magnesia and lime, is used as a substitute. As a general rule the Swedish furnaces are only kept in blast during the winter months, when the ores and fuel can be easily brought to the works in sledges. The average length of a Swedish winter is about 150 days.

THE MANUFACTURE OF BAR IRON.

In Sweden three principal methods of charcoal finery are in use: the German or, rather, the Walloon, the Lancashire, and Franche Comte processes. The first of these is confined to those forges that produce the Dannemora steel irons. The hearth is not covered, and the firing which takes place in a bath of slag is much accelerated by almost continual breaking up and stirring of the molten metal. The bloom is of small size, weighing only about 100 pounds, and is produced in from 25 to 30 minutes. The pig iron, of a white and strongly mottled character, is not charged and melted down in one quantity, but is used in the form of slabs or bars, from 15 to 18 feet long. Only the end of the slab is exposed to the fire, so that the metal melts and runs down in drops before the blast, like sealing wax in the flame of a candle, the bar being pushed forward and kept in proper position as the end wastes. The bloom obtained from the previous heat is reheated, for the first time, in the fore part of the hearth during the period of melting, being held with tongs in an inclined position; the subsequent heats, to the number of six or seven, required in drawing it into a bar under the hammer, are effected in a separate fire. The consumption of charcoal by this process is very large, being three times the weight of the bar iron produced. The loss in weight, or the difference between the bar and the pig iron used, is from 20 to 25 per cent.

The Franche Comte and the Lancashire processes are conducted in covered hearths, with flues for heating up the charge of pig iron previous to melting, and stoves for the blast, which is raised to a temperature of 100°, with a pressure of 2½ inches mercury. The principal difference between the two methods is, that in the Franche Comte process the reheating of the bloom, which is cut into two or more pieces after shingling, is effected in the same fire, while in the Lancashire forge, either a second hearth, or, what is now more usually the case, a gas welding machine is used for the purpose. The proportion of yield is about the same in both cases, the weight of bar iron produced being about 15 per cent. less than that of the pig iron used. The consumption of charcoal is, under the most favorable conditions, about the same in either process, being about one and a half times the weight of the finished bars, or only half as much as by the Walloon forge.

The Franche Comte method is, however, not used to any great extent, and only at some of the smaller iron works. The iron produced by it is of an inferior grade to that obtained by the other process, as it has been found impossible to insure uniformity of quality and evenness and regularity of texture in the bars made by this forge.

By the use of the Lancashire process a sound bloom, free from impurities, is obtained. In the forge or sinking fires, two tuyeres are generally employed, placed opposite each other, by which the production is increased and the consumption of coal diminished, while the iron produced is generally regarded as more homogeneous. The irons made by this method are generally very equal in grain, but this is supposed to be due, not so much to the primary process of manufacture, as to the peculiar mode of reheating and hammering, which they subsequently undergo. In the gas welding machine, which is now usually employed for reheating, the bloom is subjected to so high a heat as to become incandescent, so that when put under the hammer all raw iron breaks in pieces, and is thrown off in the forms of small particles and blue sparks.

With the exception of the Dannemora or Oeregrund iron nearly all the Swedish bar iron exported is made by the Lancashire method, which is, substantially, the same as the Welsh process generally employed in the United States.

Mottled pigs, half gray and half white, are used for conversion into malleable iron by the above mentioned processes. In puddling gray iron is employed without having been treated in the refinery or running out fire. The temperature, however, required to puddle the best sorts of pig iron is so high that it is difficult to procure material sufficiently refractory for the sides of the furnace, and hence but little iron is produced in that way. No Swedish puddled bars are exported; all the iron manufactured by that method being retained for home use.

For strength and ductility the iron from the Dannemora furnaces still maintains its superiority over all others, a fact which can only be accounted for by its freedom from all impurities. It is granular in texture, as indeed all Swedish irons are, and has generally a fine grain, although unequal in size, composed apparently of hard and soft particles. It also possesses this remarkable peculiarity, that when heated, it becomes very soft, and apparently full of fiber, and when cemented and cast into steel the inequalities of fracture entirely disappear.

The iron of Taberg is the softest of all the Swedish irons, and remarkable for its ductility and adaptedness for being drawn into wire. In his examination of this iron, Sefstrom discovered the presence of vanadium, although in very small quantity—scarcely 1½ grains in a solution of several pounds. No investigation, as far as we are aware, has been made concerning the effect of this metal on iron, but it is worthy of notice that it has been found in one or two other instances in iron possessed of the same peculiar quality of fitness for making wire.

For steel making in Sweden iron ore containing phosphorus is absolutely rejected, but for some purposes, such as making roofing sheets, spades, hoes, shovels and other utensils, which are to be subjected to severe wear, at least 1-10 of 1 per cent. of phosphorus in the iron is considered desirable, and ores which contain this amount are preferred to pure ores. The processes for manufacturing steel in Sweden do not call for extended notice, more especially as from the same qualities of iron, steel can be, and is manufactured in Pittsburgh equal to the best made there.

Iron of excellent quality was at one time made in Norway, but at present, and for a great many years back, there has been no such article as Norway iron in the market. Not only is there no export from that country, but its production even for home use has entirely ceased. What is known in the trade and on our price lists as "Norway bars" are all manufactured in Sweden. The old marks and the old quality are maintained, however, as well as the old name, and the buyer in no way suffers from the change in the locality of production.

From a comparison of the analysis of the magnetic ores in the Lake Superior district, with those of the ores from which Swedish iron is made, we find them very much alike in composition. They are distinguished by the same comparative freedom from phosphorus and sulphur; and in the percentage of metal, the American ores have the advantage. There is no reason, in the nature of things, why American charcoal iron, made from Lake Superior ores, should not be of as good quality as Swedish iron if made by the same processes and with the same care. All the necessary conditions are present except one—labor. The Swedish methods of manufacturing iron are expensive, even in Sweden, where labor is cheap. They demand careful, close, intelligent and watchful attention on the part of the laborers from beginning to end; such as only skillful and reliable workmen can bestow. The question with the American iron master will be, not whether it is in his power to produce iron equal in quality to the Swedish, for of his ability there can be but little doubt, but whether he can afford to do it.

The fact that all Swedish irons are of granular texture, and that they are nevertheless superior in elasticity, ductility and tensile strength to the best fibrous irons, suggests a question concerning the relative properties of granular and fibrous iron, a solution of which would enable us, probably, to account for the pre-eminence which the productions of Sweden maintain.

The strength of wrought iron evidently depends on the metal itself, and not on any foreign substances which it may contain, and the question which presents itself for consideration is—which of the two textures, granular or fibrous, affords the best guarantee for pure iron? It is well known that there are impurities in chemical combination with pig iron, by which the welding properties of the refined metal are materially affected. Sulphur prevents, while phosphorus facilitates, welding, other conditions being equal, and all iron containing sulphur will give fibrous malleable iron, while phosphorus contained in the pigs, if not counteracted by sulphur, will yield a granular texture containing neither the one nor the other of the impurities. Iron, however, which contains phosphorus to the amount of 0·5 per cent. will be brittle, and granular structure resulting from its presence is not desirable. Ores free from sulphur and phosphorus, and with a liberal percentage of manganese, will always yield a strong granular iron, if properly treated, and the Swedish ores, as a rule, are of this character. Fibrous iron can easily be produced from impure ores and inferior qualities of pig by preventing the expulsion of impurities during the process of refining or puddling, while granular iron requires their elimination. Hence, by being purer, iron of granular structure is stronger than of fibrous. The opinion is gaining ground that, for all purposes where strength and elasticity, and, before all, great reliability of the material, is wanted, good granular iron will be more advantageous than the so-called best fibrous iron. Experiments have been made, the results of which show that there is good foundation for this judgment to rest on, although for many purposes fibrous irons may be preferable.

The Huron Bay Slate Deposits.—As the slate deposits on the lands of the Huron Bay Slate and Iron Co. are attracting much attention in the Northwest, the following, from a correspondent of the Detroit *Free Press*, will be read with interest: Twelve miles from L'Anse is the newly settled village of Arvon. It is situated on Huron Bay, has an excellent harbor and docks 700 feet long. The name of the town is imitated from that of Caernarvon in Wales—"arvon" being the Welsh word for slate—the same being applicable to the settlement by reason of its connection with the slate quarries of Huron mountains. The principal quarry is on the lands of the Huron Bay Slate and Iron Company, a little more than three miles from Arvon, with which it is connected by a wooden tram road. The location comprises 1200 acres of land, and upon it explorations have shown two beds of slate, one said to be 1200 feet wide, the other 700 feet. There is no rock covering to be removed, nothing but surface soil three or four feet deep, with boulders or trees above. The slate is dark in color and of a rich and unfading luster. Winter does not interfere with the work, as was proved last year. Despite the fact that the rock was frozen, and the thermometer below zero, the slate was as readily split as in midsummer. The rock dips at an angle of 45°, making operations in removing the slate as convenient as could be desired. There are other varieties of slate, in color light gray, green, light purple and white. They can be taken out in forms suitable for mantels, floor tiles, billiard beds and all the uses to which slate is adapted. The location is on the Indian reservation, and it only came into market last November. In that time much work has been done in getting ready for quarrying, roads cut through a wilderness hitherto untracked, houses built, wharves and sheds and workshops, amounting in all to an investment of $50,000. The company employ one hundred men, and intend to increase their force to one hundred and fifty. Their monthly pay roll exceeds $5000. A number of experienced Welsh slate makers are employed, and by next spring they expect to have an ample supply on hand for shipment.

How to Cure the Panic.—A correspondent of the Lancaster *Intelligencer* prescribes the following cure for the panic, for the benefit of those who preach "contraction," "retrenchment" and "depletion." "Let every one, high or low, rich or poor, male or female, saint or sinner, no matter what their previous habits of living may have been, immediately commence the very extremest, even the most parsimonious 'retrenchment and reform'—sawing their own wood, digging their own potatoes, and bribing their own children to go to bed supperless, and then stealing the bribe after they are asleep. If it has hitherto cost a man two crackers and an ounce of cheese for his daily subsistence, let him reduce it to a single cracker and half an ounce, or contrive to 'eat ashes and drink smoke' until times change. Let all the rich manufacturers and manufacturing companies discharge all their employees, and immediately suspend operations, in order to enhance the value of the stock on hand, and cut down wages to the lowest figure; let them secure their assets against execution, shirk their liabilities, lock their doors, and retire to their parlors and dining chambers, and 'eat, drink, and be merry' inwardly, but seem poor outwardly, turning the backs of their hands to the hungry million. If any manufacturing is permitted, let it be the knitting of stocking legs to hoard money in; that's what they were originally intended for. Either by colonization, or some other cheap plan, increase that class of men who refuse to eat hay, and who won't allow others to eat it—who neither buy, nor sell, nor build, and who boast that it only costs them sixpence a day to live; that they never eat oysters, fruit or confections, and can wear a hat seventeen years, a coat fourteen, and a pair of brogans ten."

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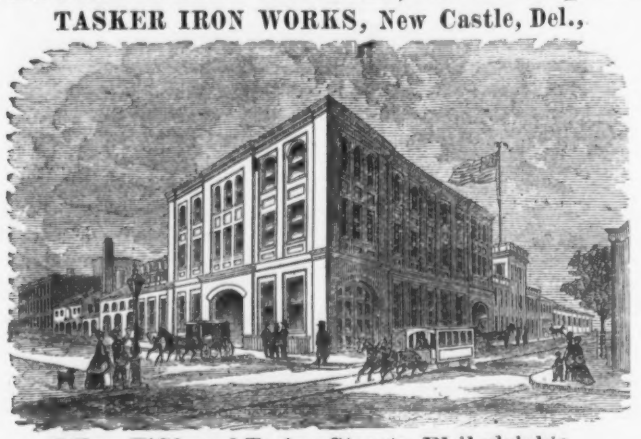

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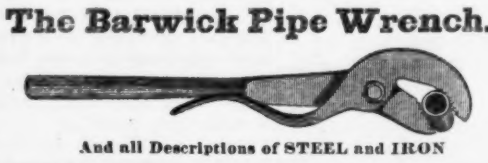

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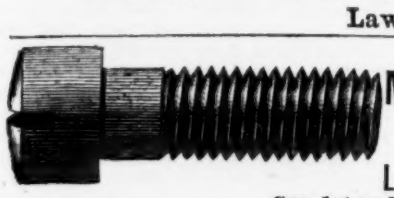

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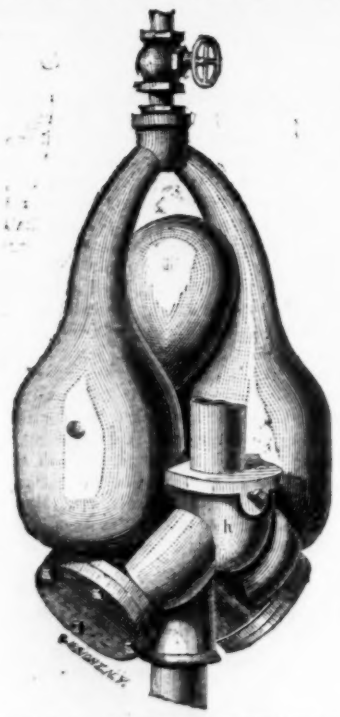

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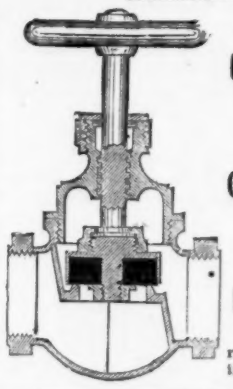

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Leather Belting

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We furnish many of the largest Iron Mills in the West, and guarantee quality of all goods sold.

Send for prices.

BUSINESS ITEMS.

NEW JERSEY.

R. H. Norris & Co., Paterson, shipped to England on the 1st inst. a case of handsomely finished steam gauges, which is expected to be followed by others, the firm being enabled, by aid of improved machinery, to manufacture and ship these goods to other countries, and sell below the prices of foreign makers.

PENNSYLVANIA.

The Catasauqua *Dispatch* of the 8th instant, says: The rolling mill at this place has been running this week, but it is not certain at this writing whether sufficient orders will be on hand to continue it next week. Catasauqua presents a dull appearance when the mill is lying idle, and it is to be hoped that work sufficient will be forthcoming to keep both mills of the company in operation.

We are informed that Mr. Fox, proprietor of the Danville Rolling Mill, paid all his workmen last month their wages in gold. This to many of the younger hands was the first payment they had ever received in the precious metal, and they felt more inclined to retain it as a keepsake than part with it for living necessities.

The Lackawanna Iron and Coal Company published a notice to its employees that, owing to the impossibility of collecting cash for iron already sold and delivered, or to sell for cash, its monthly payments in cash would cease on the 1st inst. Those who desired to work could do so, and the company would insure them supplies for their families, to the extent of their wages, and those who did not accept the regulation could stop work.

In the majority of cases the men employed at works owned by the coal carrying roads in the Lehigh and Schuylkill regions started on the eight hour system on the 1st inst., with reduced wages. The impossibility to get cash is the assigned reason for this in all these cases.

A Lancaster county mechanic has invented a device which consists of three pieces of metal, fastened together with a single rivet, answering the purpose of a hand corn sheller, a boot jack, a hammer, a hook claw, a tack drawer, a pot lifter and a wrench.

The Lebanon *Courier* says: "The ore mine on the farm of Rev. C. Bucher, in Heidleberg township, is in successful operation, and conducted by Mr. B. under a lease held by the Minersville Coal and Iron Company, who have invested about $5000 in putting up a large engine and other improvements.

The rolling mill and tube works of Seyfert, McManus & Co., on South street, Reading, have gone into operation again, and will give employment to about 600 men.

The Danville Iron Works lighted up its fires on the 29th ult.

The Norris Iron Company is furnishing the heavy castings for the engines of the Philadelphia and Reading Company's new steam colliers.

Script has been issued by some of the manufacturing establishments of New Castle and Sharon, in order to carry them through until currency becomes more abundant.

The works of Kimberly, Carnes & Co., at Sharon, give employment to 500 hands, and have 23 boiling and 6 heating furnaces; a nail factory, with 40 machines; an 18 inch muck mill, a bar mill, plate mill, hoop and guide mill. The company have now in use at their works puddling furnaces with recent improvements, consisting of hollow cast iron fixtures, built in the brick work of the neck of the furnace, through the inside of which castings a continuous stream of cold water runs from a barrel connected with it by pipes, similar to a blacksmith's tuyer. This improvement, it is claimed, improves the quality of iron, and effects a gain of over 900 pounds over the products of the ordinary furnace in one week, beside being a great saving in the matter of fuel.

The new Baldwin furnace of the Pennsylvania Steel Company, of Harrisburg, went into blast a few days ago. This furnace is 14 feet at boshes, and is intended for the manufacture of Bessemer pig.

Scranton will soon have a new manufacturing establishment—an axe and edge-tool factory. The buildings are in course of erection.

Mr. D. Pruner, of Bellefonte, has erected a horse shoe factory at Milesburg, which is now ready to go into operation. Mr. Pruner is the inventor of a machine that makes shoes at the rate of 20 per miuute.

The Reading *Times* says that the Philadelphia and Reading Coal and Iron Company are at present working 33 mines on their immense tracts in the Schuylkill coal region. They have, beside, 47 others let out on lease, all of which are making full time. Twenty-three others are either being opened up or in course of improvement. The monthly roll of the company is over half a million. The men are being paid as usual, and no dismissals are proposed.

Mr. W. F. Durfee, of Philadelphia, has been appointed superintendent of the Milwaukee Iron Company. Mr. J. J. Hagerman, heretofore secretary and superintendent, will hereafter be secretary only.

The new rolling mill and spike manufactory at Schuylkill Haven commenced operations on the 10th inst. It is expected to turn out 50 tons of spikes and bar iron per week.

MASSACHUSETTS.

The West Amesbury Axle and Wheel Company's personal property, consisting of a large quantity of finished and unfinished carriage axles and wheels, and the machinery for manufacturing the same, has been sold under attachment. The proceeds of the sale will probably amount to $10,000 or $12,000, the machinery being sold for $5000. The property has been lying idle for several months, the company having been obliged to suspend business in consequence of unforeseen difficulties. A new company will probably be formed.

The fires at the Lancsboro Iron Works have not gone out, night or day, since July, 1872, when the "blast" was begun, and the "hearth" or pot where the ore is molten yet holds good. The furnace uses 1500 bushels of coal per day, which is charred in 15 kilns in Lancsboro, Hancock, New Ashford, and Williamstown, from the forests in which towns 50 cords of wood are daily cut to keep the kilns and pits burning. One hundred and fifty furnace men and colliers are employed. Thirty tons of ore are daily used, and 60 miners are employed to dig it.

The Buckeye Mowing Machine Works, at West Fitchburg, recently partially burned, are being rebuilt.

CONNECTICUT.

Howe's Sewing Machine Factory, at Bridgeport, has a front of 1256 feet, is five stories high, and employs 1500 hands, who make 500 machines a day. In the needle department 20,000 needles are manufactured in one day by the 180 men and women employed. From the wire steel coil up to the time when the needle is ready for use, it passes through 50 different hands.

OHIO.

The furnace at Martin's Ferry, which has been in operation for three years, has been blown out to give opportunity for necessary repairs. It will again go into blast as soon as possible.

Six months ago the Revolving Scraper Company, Columbus, began operations, and they have already manufactured $80,000 worth of revolving scrapers and railroad plows, of which all but $5000 worth has been sold. The company's capital stock is $50,000, and raw material to the amount of $40,000 has been used in the half year. Three buildings are occupied, one, of two stories, is 31 by 105 feet; one is 40 by 65 feet; one is 40 by 100 feet. Thirty hands are employed and the monthly pay roll is $1200.

The financial troubles do not appear to affect the manufacturing industries of Youngstown, Messrs. Brown, Bonnell & Co. and Cartwright, McCurdy & Co., are running double time, and the Valley Rail Mill is expected to resume work immediately.

Lord, Bowler & Co., Cleveland, have built up an annual trade of $140,000 in five years, and now employ $40,000 capital and 50 men in the manufacture of engines and all kinds of machinery. During the past year they have built 38 stationary engines, beside doing a large amount of stone quarry work and also much repairing, using 300 tons of cast iron and 100 tons of wrought iron. The main building of the works is two stories high and 88 by 90 feet in dimensions. The monthly pay roll is $2000.

The Columbus Rolling Mill is working full time, having some heavy contracts made previous to the panic.

The Cleveland Stove Company has been in business twenty-three years, and uses $160,000 capital in its operations, being engaged in the manufacture and jobbing of all classes of stoves and hollow-ware as well as tinners' supplies. 75 to 100 hands are in the employ of the company, to whom $5000 is paid monthly, and by whom 12,000 to 15,000 stoves are made annually, consuming 1200 tons of pig iron. The annual sales of the business amount to $300,000.

MICHIGAN.

The furnace which was built at Menominee, last winter, for the manufacture of pig iron with charcoal made from slabs and edgings from saw mills, is producing over 130 tons of iron per week, and consuming about 185 bushels of coal to the ton of iron manufactured.

The Duluth blast furnace company are now getting in a supply of ore to begin operating with in the spring before the opening of navigation. The furnace is in a forward state of construction. It is to be 9 feet 10 inch boshes, and 45 feet high. The officers of the company are George K. Shoenberger, president; B. F. Russell, treasurer; John F. McLaren, secretary; J. T. McCallum, manager. It is expected that the blast will be put on about the 1st of April.

Quite a degree of excitement prevails at Duluth on account of the discovery in the neighborhood of what is supposed to be a large deposit of magnetic iron ore. But enough has not been taken out, nor assays made of it, to determine the character of the claim.

The furnace at Lawton, which has had a very successful run, turning out some days 22½ tons of iron, or upward of 140 tons per week, is about to be blown out for repairs.

INDIANA.

The machinery for the Quaker City Iron Works is to be moved from Richmond to Indianapolis.

CALIFORNIA.

Smelting works are to be erected at Fairplay, a company having been formed for that purpose. Their capital is $100,000, and the buildings will be constructed immediately.

VIRGINIA.

There is some talk of establishing an iron furnace and rolling mill at Alexandria. Parties from Philadelphia, having capital enough for the undertaking, are making inquiries at the above place with that object in view.

Those who look forward with gloomy apprehension to the future would do well to consider the following statistics. The manufacturing product of the United States was $4,232,325,000 in 1870 against $2,885,801,000 in 1860, not including those of mining, quarrying and fishing, which are included in totals of 1850 and 1860. The hands employed in 1850 were 957,059; in 1860, 1,311,246; and in 1870, 2,053,996; capital invested in 1850, $533,245,351; in 1860, $1,009,885,715; in 1870, $2,118,288,750; amount of wages in 1850, $436,755,464; in 1860, $378,878,966; in 1870, $775,584,343; value of materials in 1850, $555,123,822; in 1860, $1,031,695,092; in 1870, $4,881,227,242. When a country has such a manufacturing interest for the basis of its prosperity, with enormous crops beside, and a foreign demand for all the product of its soil that can be spared for export, it is in no danger of national bankruptcy.

HENRY DISSTON & SONS'

SAW, TOOL,

STEEL AND FILE WORKS,

Front and Laurel Streets,

PHILADELPHIA, PA.

H. W. PEACE,

MANUFACTURER OF

SAWS OF ALL KINDS.

FACTORY, WILLIAMSBURGH, N. Y.

AMERICAN SAW CO.,

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Solid saws require frequent gumming, thereby subjecting them to risk of springing or breaking. This is especially the case with cross cuts having *Patent Teeth*. In the perforated saws **all gumming is avoided,** and the teeth are easily kept long and in *proper shape*, saving *files*, *labor*, *expense* and *vexation* As is well known, our saws cut faster, smoother and easier than any other.

MOVABLE-TOOTHED CIRCULAR SAWS AND SOLID SAWS OF ALL KINDS.

GEORGE GUEUTAL,

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IMPORTER OF

Wood Screws, Steel in Sheets,

BAND SAWS, TOOLS FOR BRAZING, &c.

Bed Screws, Pin Hinges, and Wire Nails a Specialty.

Greenfield Tool Co.,

Sole Manufacturers of the celebrated

"DIAMOND" PLANE IRONS,

Of *uniform* temper, and will *hold* a fine cutting edge; with solid *steel caps*, and *fully warranted*.

TRADE GREENFIELD TOOL CO. WARRANTED CAST STEEL

AND THE

Patent Machine Forged Ox Shoes,

Better and cheaper than any hand made shoe, universally liked, and always used after one trial. Also

BENCH AND MOULDING PLANES of every description.

Address, for illustrated catalogue and prices,

GREENFIELD TOOL CO., Greenfield, Mass.

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Largest Stock and Best Assortment in the United States of

Shank and Socket Firmer Chisels.

Also, BEST QUALITY SOCKET FRAMING CHISELS.

WOODROUGH & McPARLIN,

MANUFACTURERS OF

PATENT GROUND

SAWS

OF ALL KINDS, INCLUDING

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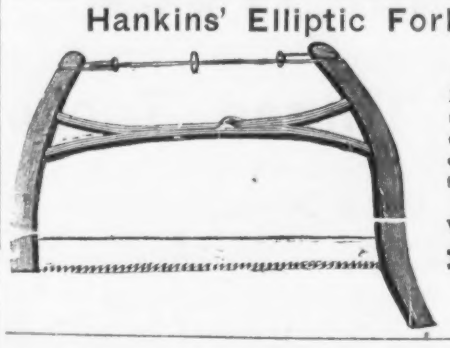
CINCINNATI, O.

Hankins' Elliptic Forked Saw Frame.

Patented June 28th, 1870.



The annexed engraving represents HANKINS' ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Brace being all in one piece, without any centre bolt, secures for the Frame great strength and durability.

These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

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WEST PHILADELPHIA,

Manufacturers of

Plasterers' and Brick Trowels

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ALSO,

Saddlers' Round Knives etc.,

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E. C. ATKINS & CO.,

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Best Cast Steel Patent Ground Saws

Also, sole Manufacturers of Atkins' Patent

CROSS-CUT SAW HANDLE.

Best Patent Handle in use.

Manufactory and Office—Nos. 210, 212, 214 and 216 South Illinois Street.

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I make a specialty of the LARGEST SIZES of **Circular Saws,** and call particular attention of lumber manufacturers to the following points of excellence:

Evenness of Temper.—The peculiar structure of my furnace subjects all parts of the saw to a DEAD heat, and when dipped in the oil bath secures perfect uniformity.

Perfect Accuracy in Thickness.—My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed BALANCES PERFECTLY, which is proof positive of the right accomplishment of the work.

Properly Hammered.—Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time RUN TRUE. This department is under the personal supervision of myself, who has devoted over *twenty years* to the art of saw making.

I am *sole* proprietor and manufacturer of the celebrated **"Challenge" Cross-Cut Saw.** Price Lists of all kinds of saws sent on application.

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MANUFACTURERS OF

Mining & Paving Tools,
H. Nelson's Solid Eyed Pick,
Kip Hammers,
Stone Breakers,
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Hand or Mash Hammers,
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Block Stone Sledges,
Mauls,
Sledges,
Blacksmiths' Sledges,
Masons' Brick Hammers,
Swedges, all sizes,
Mill Picks, Crow Bars,
Smiths' Hand Hammers,
Coopers' Hammers,
Masons' Stone Axes,
File Cutters' Hammers,
Striking Hammers,
Fullers, all sizes,
Horse Shoers' Tools,
Rail Tongues.

HAMMERS of all kinds made to order, on receipt of Pattern or Drawing. Special attention paid to R. R. Work

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THE OHIO COAL HOD CO.

MANUFACTURE

MARKLAND'S PATENT ALL WOOD BOTTOM

COAL HOD,

437 East Front Street, Cincinnati, O.

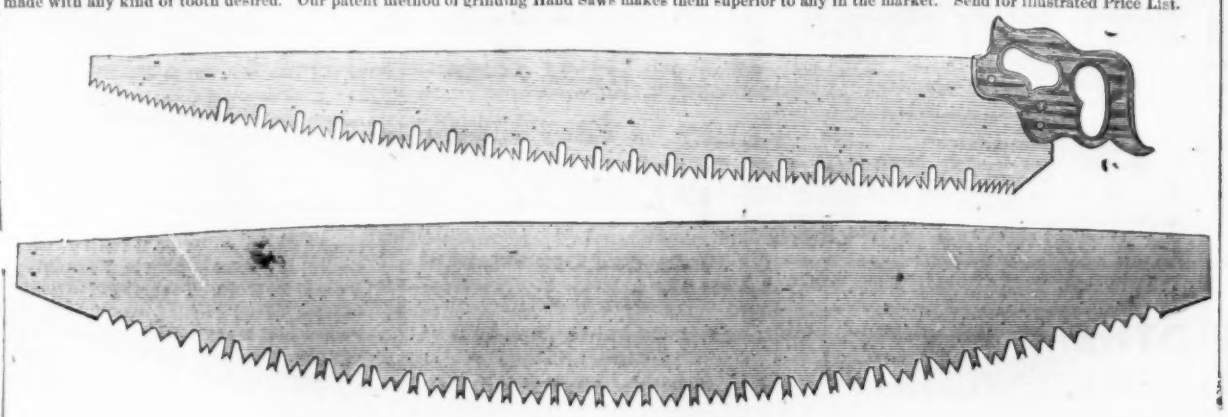
These Hods are far superior to the old style of *All Iron* Hod, as the bottom and foot is made of *one piece* of *light and tough wood*, which will not *rust*, *split*, *break*, or become *ragged* in the foot or rim, like the old style, and there is not the *least* danger of punching holes through or knocking the bottom out.

With ordinary care, we will guarantee the **GALVANIZED All Wood Bottom Hod** to last five years. Have known them to last seven years, and still remain in use

J. FLINT & CO.,

Manufacturers of all kinds of SAWS and PLASTERING TROWELS, Rochester, N. Y.

A large Stock of **Cross Cut Saws** constantly on hand. Orders filled promptly. **Dietrich's Double Handle One Man Cross Cut Saw** made with any kind of tooth desired. Our patent method of grinding Hand Saws makes them superior to any in the market. Send for illustrated Price List.



BOYNTON'S LIGHTNING SAWS.

Awarded the Medal of the American Institute, 1872.

Two Direct Cutting Edges, instead of one Scraping Point. Note extra steel and durability over the old V, outlined on M tooth. &c.

A Challenge of $500, toward expense of a public test, to prove that the Lightning Saws excel all others in Speed, Ease, and Simplicity, has been offered since 1870, and has never been accepted. More than 100,000 Lightning Saws were sold during the year 1872, the purchasers of which testify to their superior merits.

Our leading papers, such as the *Tribune*, *American Agriculturist*, *Christian Union*, etc., have published over sixty editorial notices recommending these Saws. Farmer's Clubs, Lumbermen, and Hardware Dealers unite in pronouncing the genuine Lightning Saw the greatest labor-saving implement of the age.

I have hundreds of letters from practical sawyers, voluntarily written, expressing their entire approval of these Saws.

Where the Hardware Trade do not sell the Lightning Saw, I will send a 6-foot cross-cut and a buck saw-blade on receipt of $5.

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Patent Screw Socket Scuffle Hoes, and

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Mowing Machine Sections of all patterns constantly on hand.

WHEELER, MADDEN & CLEMSON,

Manufacturers of Warranted Cast Steel

SAWS

of every description, including

Circular, Shingle, Cross Cut, Mill, Hand, Roberts' and other Wood Saws,

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of the well known brand of

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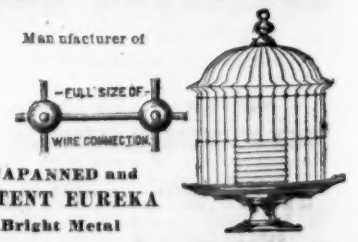

JAPANNED and PATENT EUREKA Bright Metal

BIRD CAGES.

Nos. 247 & 249 Pearl Street

NEW YORK.

Tests of Steel.

BY A. L. HOLLEY.*

The intention of this paper is not to discuss this important subject in all its bearings, but merely to point out why mechanical tests of steel, as ordinarily made, are not, alone, of any special value to engineers—certainly not to general mechanical engineers.

The agents of the Barrow Hematite Steel Company, one of the largest and most successful Bessemer establishments in England, have recently distributed a report, made by Sir William Fairbairn, on the transverse, tensile, and compressive resistances of certain bars of this steel. The number of tests is very large; they seem to be careful and minute; and the modulus of elasticity, the work up to the limit of elasticity, and the limit of working strength, are fully tabulated according to the latest formulæ.

This is very well—indeed, it is indispensable, as far as it goes; but it goes no further than to inform the ordinary engineer that there is an unknown substance which possesses these physical properties. As to what the substance is, the report gives him no working knowledge, for not a single analysis is given of any of the bars tested. The most that is said of some of them is that they are either "hard" or "soft," which is sufficiently evident from the experiments. "A bar of steel," is, in the present state of the art, a vastly less definite expression than "a piece of chalk." To the engineer who wants steel for a specific purpose, it gives only the faintest clue, to say that steel is hard or soft. There are a dozen grades of both hard and soft steel, adapted to different purposes. Rail steel is soft, and boiler plate steel is soft, as compared with many structural steels, and with the whole range of spring and tool steels; but the one perfectly adapted to rails would be useless for boilers.

In order that engineers may know what to specify, and that manufacturers may know not only what to make, but how to compound and temper it, the leading ingredients of each grade of steel must be known. Pure iron would be unfit for nearly all structural purposes. Upon the substances associated with it depend its hardness, malleability, stiffness, toughness, elasticity, tempering qualities, and adaptations to various structural uses. These ingredients are, indeed, impurities, but the term "impurity" unfortunately implies a defect, whereas the thing may really impart the essential quality. All the usual ingredients give what is called "body" to steel. Carbon, within specific limits, as is well known, gives hardness, elasticity, resistance to statical strains, and tempering qualities. Under certain conditions of composition it even gives resistance to sudden strains. Manganese (and this fact, by the way, is not so generally known) gives, in different proportions, hardness, toughness, malleability and elasticity. Chromium imparts similar qualities, but to what precise extent we do not know, in default of a proper comparison of chemical and mechanical tests. Silicon, although considered a bane by steel makers generally, and, singularly enough, advertised as the great panacea for the weaknesses of steel by certain modern inventors, has probably, in proper proportions, a healthful influence on the physical properties of steel. Even phosphorus, the arch enemy of the Bessemer and open hearth manufacture, may in some degree be a valuable ingredient.

Whether or not certain foreign substances, which, separately added, produce similar results, would produce a better result if combined in certain proportions—for instance, whether carbon alone in any degree, or silicon alone in any degree, would make as good a steel for certain uses as carbon and silicon combined, it is, in default of proper experiments, impossible to state. The probability is, that there is a proportion of carbon and manganese which would give the highest possible value to all structural steels. We formerly added spiegeleisen to decarburized Bessemer metal solely to impart manganese to the oxygen of the oxide of iron formed in the Bessemer process. We now add a larger proportion of spiegeleisen, not only to remove the oxygen, but also to mix manganese with the steel. And we think we find that if the proportions of silicon and phosphorus are sufficiently low, and carbon does not exceed a third of one per cent., manganese to the amount of three-quarters of one per cent. gives the resulting product a high degree of toughness and hardness combined—a degree of suitableness for rails which no proportion of either carbon or manganese, not associated, can impart.

When we consider that two or three-tenths of one per cent., and, in some cases, a fraction of a tenth of one per cent. of foreign metals, will change the character of steel in a high degree, and when we farther consider that the physical results of these combinations have never been tested or analyzed in any thorough and comprehensive manner, we may well reiterate the common expression that the iron and steel manufacture is in its infancy.

But it is not necessarily in its infancy. We simply do not develop it. The general complaint of engineers and machinists is, that they occasionally get, but can never get regularly, the precise quality of steel they require; and yet it is probable that thousands of tons of steel have been made which are suitable for each of these purposes, but have been used for others, and that the precise grade required in every case could be reproduced by the ten thousand tons. The trouble is that neither the user nor the makers know what the material *is*. They have put no mark on it by which they can recognize it; they have kept no recipe. All they can do is to use ingredients of the same name, and approximately the same quality, and to guess at the physical properties of the product, aided by such crude tests as can be made during manufacture. Mr. Wm. H. Barlow, in a late address on modern steel before the British Association, says that one reason why steel is not more used for structural purposes is, that the metal is of various qualities, "and we do not possess the means, without elaborate testing, of knowing whether the article presented to us is of the required quality." But neither Mr. Barlow, nor any of his associates in government experiments, proposes the true solution of the difficulty. It is no more necessary to test one or two of each lot of bars to destruction, in order to find out the quality of the rest, than it is to burn up a Chinese village to get roast pig.

If the user would *analyze* not one, but twenty samples of the steel that meets a particular want, and then base his order on an analysis that should come within the highest and lowest limits of the samples, he would get substantially the same metal every time. The problem is a more difficult one for the steel maker, since he must analyse the many materials that go into his product; but if he imposes the same restrictions on the makers of these materials—in short, if from the ore and limestone and coal, up to the finished bar, each user buys by analysis, and pays in proportion to uniformity, the production of steel of the most multiform grades and qualities, each homogeneous and uniform to any extent of production, becomes a possible, if not a comparatively easy, matter.

What are Sir William Fairbairn, and Mr. Barlow, and Mr. Kirkaldy, and the other great experimenters in the physical properties of steel—in its adaptation to certain specific uses—what are they doing to relieve the engineering world from these uncertainties? They are simply discovering the vast number of qualities which steel may be made to possess, without giving more than a clue to the method by which these qualities may be predetermined and reproduced. They are going to a vast expense of time and material to inform us, not that a certain combination of metals, but that a *bar of steel*, has such resistance and elasticity. This sort of experimenting has much the same value as the steam engine tests of a late chief engineer in the navy, of whom it is said, that in a coal consumption test he would calculate the ashes to ten places of decimals, and guess at the coal put into the furnaces.

Moreover, Sir William Fairbairn may be doing injustice to other steel makers, to Brown, Cammell and Bessemer—bars of whose steel he has also similarly tested, and found not quite so good for certain purposes as the Barrow bars are. But he neglects to make it clear that the disparaged bars may be better than these particular Barrow bars for other purposes. He makes the mistake, which we should suppose Sir William, of all men, would not make, of being absurdly general and random in one element of his conclusions, while he is fractionally accurate in others—of cramming the whole matter of chemical ingredients into the terms "hard" and "soft."

The first and easiest step in the desired direction is to find out what *X* is. It is not necessarily a bar of steel made by Turton & Sons, which one tool maker will swear by and another swear at; nor is it necessarily a boiler plate steel which Park Bros. made once, and Firth got at twice, and Singer, Nimick & Co. hit two or three times. It is a steel which Turton, and Firth, and Park, and Singer, can, either of them, make by the ten thousand tons, if you will only tell them what it is made of, as well as what its physical qualities are. In the various uses to which engineers have applied steel, there are a vast number of specimens which have long fulfilled all the requirements. When more steel of the same sort is wanted, the usual method is either to apply to the same maker, who kept no complete record, and does not know what is wanted; or to get bids based on a stereotyped and very inadequate physical test, for instance, that the bar must stand such and such a blow from a drop. The lot of steel is made, and is, as well it may be, very heterogeneous in physical character, although it may be in accordance with the one test. The result is that, under wear, some of it fails, or, under load, an excessive margin of safety must be allowed. The obviously rational way to reproduce a lot of steel which is proved suitable for any purpose, is to analyze many samples of it—at least for carbon, manganese, silicon, phosphorus, and any element which exceeds a tenth of one per cent., and thus to give the steel maker a recipe for making it.

It may be suggested that this chemical synthesis of steel will be ruinously costly. For certain exact purposes, such as the members of a long span bridge; or for certain fine purposes, such as gun barrels, the cost of analysis, or any loss in applying to other uses the lots of steel that were not up to the mark, would be very small, compared with the extraordinary margin of strength that must be given to an uncertain metal, and compared with the cost of occasional failures under final test. And this cost, whatever it is, the user, that is to say, the public, should and must bear.

But steel makers will find that working by analysis is not so very formidable, after all. The color test of carbon is already applied to all charges of all Bessemer and open hearth makers, and it is one of the most important. There is another view of the case: After a certain experience in comparing mechanical tests, which are comparatively easily made, with the more costly determinations of manganese, phosphorus, &c., the expert will not need to analyze every charge. He will learn to read manganese, approximately, in an elastic limit test, just as the expert blacksmith can now read carbon quite accurately by the water-hardening test. Herein will lie one of the values of the combined mechanical and chemical tests—that they will supplement and prove each other.

When the proper amounts of carbon, manganese, silicon, &c., for certain uses are known, it will not be impossible to approximate to them, in the Bessemer process, to a very helpful degree, and in the open hearth and crucible process, to a reasonably accurate degree. Of course, the character of the ingredients must be much more definitely known than at present, and numerous batches of nominally the same ingredient, such as pig iron, blooms, or puddle balls, must be mixed, so as to largely dilute any high degree of impurity which any one batch may contain.

The thing first in order is, of course, to ascertain the mechanical properties of all grades of steel—not merely the individual resistances to destructive strains, which are but the stones that compose the mosiac, but the resistance within the elastic limit, which is the finished picture. To this end experiments like those of Sir William Fairbairn are indispensable, but to these must be added analysis of every grade of steel that can be produced, or the character of the metal is but half known.

In the present state of constructive and metallurgical art, it thus seems not only vitally important, but highly feasible, to increase in a large degree the uniformity of all grades of steel, and to make grades adapted to all special uses, instead of following the hit-or-miss and large-margin system, or want of system, that now obtains. Of course the change must come slowly, and its early stages will be attended with difficulty and expense; but there can be no question as to its ultimate success and its immense advantage in constructive and manufacturing engineering and art.

What probable expense of experimenting is to be considered when it will increase, possibly double, the resistance of metals to specific stresses, and decrease the present enormous margin of safety? It seems unaccountable that government commissioners have so long neglected the chemical half of the problem—have so long neglected to complete the circuit, so that the metal will tell us its own story.

*Read before the American Institute of Mining Engineers, at Easton, Pa., Oct. 22, 1873.

Extraordinary Hail Stones.

The Rolla (Mo.) *Herald* of recent date says:

"Mr. Isaac DePriest, of Shannon county, called at this office on Tuesday of this week and related to us the particulars of a terrific hail storm which passed over a portion of his county on Sunday, October 5th, and which has never been made known to the public. The storm, unprecedented in the annals of history, arose in the northwest corner of Shannon, and travelled eastward. When near Pine Hollow, it seemed to gather its entire force, and swept down almost in one solid mass of ice. Wm. Elwood states that several lumps of ice were to be seen as large as a nail keg, and that none of the hail stones were smaller than an egg. They froze together in their downward course, and, when striking the ground, emitted a ringing sound like that of a crate of earthenware let down from heaven. Part of the house of the Rev. Mr. Moore was swept away, leaving a sick wife exposed to the storm. It was with great difficulty that Mr. Moore succeeded in shielding her from the hailstones, and even then at the risk of his own life. Chickens and birds are now unknown to the people of that section, having been devastated and carried away by the fury of the storm. Hogs and geese were killed in large numbers, and in some instances cattle. The pine trees were stripped of every twig, and large holes were made in some of them. The grass has the appearance of having felt the mower's scythe, being cut off close to the ground. In fact, the work of destruction was carried on with no slack hand, and the people will ever bear in mind the terrible Sunday of 1873."

Commenting on this statement, the Philadelphia *Ledger* says:

"A nail keg is not a definite quantity from which to make calculations, but a lump of ice the size of an ordinary nail keg would probably weigh more than a hundred pounds. Such hail stones would, of course, be remarkable, but there are well-authenticated cases of hail storms in which stones have fallen weighing four and a half pounds, and some instances are reported in scientific books where the stones were considerably larger than a nail keg. During the latter part of October, 1844, hail stones weighing eleven pounds, fell in the south of France. On May 8, 1802, there was a heavy hail storm, and a piece of ice was afterward 'picked up' which measured more than three feet both in length and in width, and was more than two and a quarter feet thick. Dr. Foissac cites the fact, and does not consider it an exaggeration. We may, however, without doubting the measurements, question the propriety of saying that it was 'picked up,' for a lump of ice the size given would weigh somewhere in the neighborhood of 1100 pounds. Dr. Foissac dissolves all doubt of the story by adding: 'During a heavy storm in 1843, the noise as of a terrible wind was heard in the air, and soon after there fell in a field not far from our house a piece of ice *larger than a millstone*. It was broken up with a hatchet, and though the weather was very warm, it took three days to melt completely.' If this be true, there is nothing improbable in the chronicle dating from Charlemagne, which relates that there fell hail stones fifteen feet wide by six long and eleven thick, nor in that of Tippoo Sahib, which speaks of a hail stone as big as an elephant. In the light of such records how insignificantly small appear those otherwise remarkable hail stones of Missouri."

The Situation in Boston.—A Boston letter says: Although it is impossible to arrive at any definite estimate, it is nevertheless in keeping with truth to say that there are thousands and thousands out of employment right here in Boston, and hundreds are being added daily to the list. The rebuilding of the burned district has afforded employment to large armies of laborers and mechanics, but there were a great many more who came here after the fire in the hope of getting work than it was possible to employ. In fact, within a month after the conflagration the supply of labor exceeded the demand, and the excess has been on the increase ever since. Now that the work of rebuilding is rapidly approaching completion a great many are thrown out in consequence, and the panic, beside, is forcing employers to discharge large numbers of mechanics, operatives, clerks and working girls. The idlers on the wharves, on the Common, and the stragglers who flock to station houses for a shelter and a place to lay their heads, tell plainly that a winter of unusual hardships and suffering is at hand. The police say there was nothing like it ever known here before. Soup houses, which have been features in Boston during the past few winters, will be established several weeks earlier than usual this winter, and preparations will be made for issuing quadruple the quantities heretofore dispensed. The Young Men's Christian Association, which has made itself useful since the fire as a sort of labor bureau, finds itself burdened with applications of the needy, and only a few days ago it sent through the Associated Press a statement that Boston does not afford remunerative employment for one out of fifty of its idle thousands, and that it is worse than useless for others to come here for work.

British Exports of Lead.—The London *Times* says: The quanity of lead exported from the United Kingdom in September amounted to 3273 tons, as compared with 3934 tons in September, 1872, and 4005 tons in September, 1871. The largest share in these exports was sustained by Russia. The aggregate exports of lead for the nine months ending September 30 this year were 24,286 tons, as compared with 37,053 tons in the corresponding period of 1872, and 34,583 tons in the corresponding period of 1871. In these totals Russia figured for 5629 tons, 7218 tons and 4393 tons respectively. The decline in our lead exports this year has been shared in by almost every one of our lead consuming neighbors. The value of the lead exported in September was £78,812, as compared with £81,833 in September, 1872, and £76,552 in September, 1871; and in the nine months ending September 30 this year £565,687, as compared with £740,403 in the corresponding period of 1872, and £665,060 in the corresponding period of 1871.

Tasmanian Iron.—Tasmania would appear to be about to compete in the production of charcoal steel for the English market, and a scheme is afloat to erect works on the banks of the Tamar for smelting the brown hematite ore found in the neighborhood, which is said to contain from 60 to 70 per cent. of metallic iron. In the geological surveyor's report, upon the country near Ilfracombe, in the west Tamar district, he speaks of the outcrops of the ore, and gives it as his opinion that the cubic contents of that portion of the vein above water level would be about 705,800 tons, all of which might be got by open work, whilst every yard in depth below the water level would, according to his calculation, yield—taking of course the whole length of the vein—20,458 tons; and again, in the report of commissioners of inquiry on the state of agricultural and trade in New South Wales, it is stated that this ore has been found "to consist of pure protoxide of iron similar to the black iron ore of Sweden, and furnishing a very pure and malleable metal," whilst Clark & Ford, assayers of Melbourne, state that it contains 72 per cent. of metallic iron. Beside these hematite deposits there would appear to be drifts of magnetic oxide almost surrounding them, and Charles Gould, the geological surveyor, seems to consider that these have probably been re-made from some pre-existing bed of ore; but the presence of the two qualities in such close proximity is a favorable feature for the production, by admixture, of superior quality, for which, too, the forests which exist in the neighborhood would afford supplies of charcoal. The difficulty of the district is of course labor, but this is one which will cure itself as the population increases.

The new torpedo boat, which was launched at the Brooklyn Navy Yard, last Wednesday, is the well known vessel designed by Admiral Porter, upon an entirely novel plan, and has been a year building. To a certain extent she resembles a cigar—being of narrow beam, with a tapering bow. She is built of iron, 170 feet long, 28 feet beam and 12 feet hold, her displacement being 800 tons. The vessel, without her machinery, weighs 527,000 pounds. She is to have 200 horse-power compound engines, and is divided into compartments, with a double bottom, having pumps and valves so arranged as to settle her in the water to the level of the deck. She has a torpedo spar projecting from the bow, and three similar spars on either side. Strength and speed, with the ability—by means of the Fowler paddle wheel—of turning within her own length, have been the objects chiefly in view in her construction. The torpedoes are to be attached to the side of an enemy's ship, and exploded by electricity. Although her launch was hurried, she is not nearly complete, and can scarcely be ready for sea before next year.

Improvements in the manufacture of steel rails have recently been made by a Prussian engineer, by combining hard ingots or blocks of steel in the process of casting, with laminae of soft steel or wrought iron, in such a manner that the latter, in undergoing the rolling process, may assume an internal position; thus combining a certain amount of elasticity, ductility and toughness in the interior, in resistance to fracture, with a hard exterior to undergo wear and abrasion.

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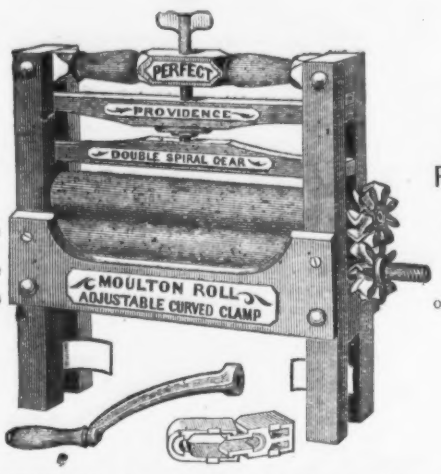

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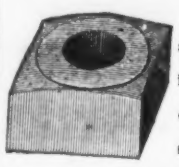

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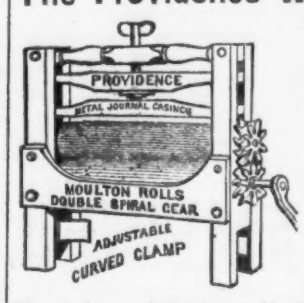

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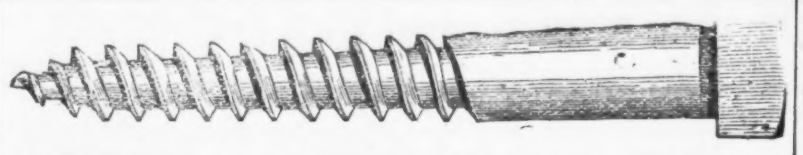

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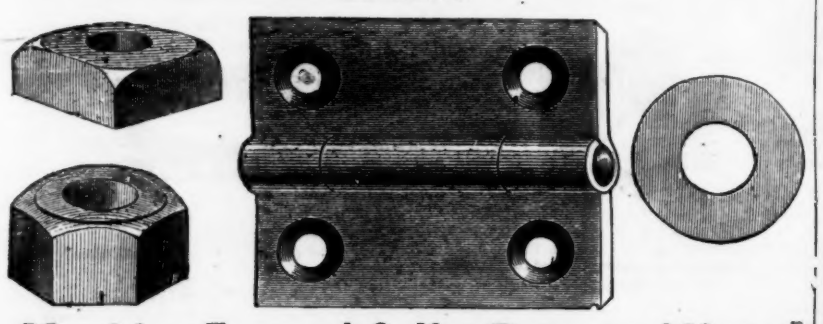

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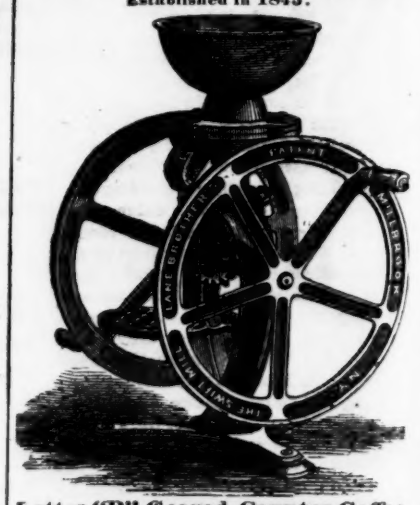

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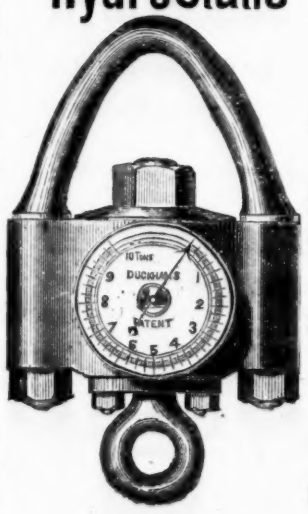

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CAUTION.

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Made from Best English Steel, &c.

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"NICHOLSON" FILES

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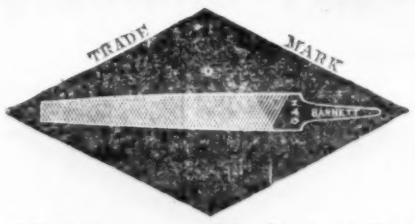

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The Iron Age.

New York, Thursday, November 20, 1873.

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CONTENTS.

Our Foreign Trade.

The balance in favor of the United States, in our trade with foreign countries, is steadily augmenting, and by the end of the year we shall be in a position to make a very handsome exhibit. During the month of October last, the imports at this port reached a total of $37,145,783, against $30,919,693 for the same month of 1872; but while the withdrawals from bond in October, 1872, amounted to $11,619,693, the withdrawals for October, 1873, amounted to only $7,861,494. Doubtless most of the goods now in bond were imported in anticipation of a brisk fall and winter trade, and the disappointment of this expectation will have a tendency to make importers more cautious. The totals of imports at this port for the ten months ended with October, present a still more satisfactory showing. They are as follows:

IMPORTS OF MERCHANDISE AT NEW YORK FOR TEN MONTHS FROM JANUARY 1.

	1871.	1872.	1873.
Dutiable goods	$304,188,995	$331,070,618	$264,502,314
Free goods	24,884,789	44,866,612	74,458,390
Total ent. at port	329,073,784	375,936,230	338,960,704
Withdrawn from warehouse	109,487,119	139,562,819	104,701,744

From this it will be seen that our merchandise imports at this port have fallen off this year, as compared with last, $36,975,526; and that while the amount of goods withdrawn from bond from January 1 to October 31, 1872, was $139,562,819, the amount withdrawn for the same period in 1873 was only $104,701,744, against entries for warehouse to the amount of $100,559,827.

The showing of our exports is still more encouraging. The exports, exclusive of specie, from this port during October, as compared with those for the same month of the two years preceding, were as follows:

EXPORTS, EXCLUSIVE OF SPECIE, FROM NEW YORK TO FOREIGN PORTS DURING OCTOBER.

	1871.	1872.	1873.
Dom. produce	$21,755,792	$24,374,195	$30,609,745
For. free goods	15,092	108,660	103,781
For. dutiable	585,343	641,894	533,312
Total	$22,356,227	$25,124,749	$31,246,838

The comparison for the ten months is as follows:

EXPORTS, EXCLUSIVE OF SPECIE, FROM NEW YORK TO FOREIGN PORTS FOR TEN MONTHS FROM JANUARY 1.

	1871.	1872.	1873.
Dom. produce	$188,170,463	$182,476,854	$237,866,385
For. free goods	1,011,954	1,256,003	1,721,948
For. dutiable	6,479,259	8,059,904	7,410,440
Total	$195,661,666	$191,792,761	$246,498,773

The specie movement is shown as follows:

IMPORTS OF SPECIE AND BULLION AT NEW YORK FOR TEN MONTHS FROM JANUARY 1.

1871.	1872.	1873.
$6,192,628	$5,265,429	$13,771,361

EXPORTS OF SPECIE AND BULLION FROM NEW YORK TO FOREIGN PORTS FOR TEN MONTHS FROM JAN. 1.

1871.	1872.	1873.
$59,706,815	$63,111,513	$43,666,548

With these figures before us, we have no reason to complain of the situation of affairs, so far as our foreign trade is concerned. With a gain of over eight and a half million in specie, the imports at this port since January 1 have fallen off twenty-eight and a half millions, as compared with last year; and while our specie exports show a decline of twenty millions, our exports of produce and merchandise have increased fifty-four millions. The favorable difference is relatively greater at other ports, owing to the fact that while New York imports somewhat more than three-fourths of the commodities brought into the country, she exports somewhat less than half the produce and merchandise sent out of the country.

Of course, this falling off in importations and withdrawals from bond have had the effect of diminishing the customs receipts of the Treasury, as will be seen from the following comparisons:

CUSTOMS RECEIVED AT NEW YORK FROM JAN. 1.

	1871.	1872.	1873.
First quar.	$39,573,967·80	$42,124,000·14	$35,753,538·97
Sec'd quar.	34,118,140·43	31,698,709·62	26,322,977·68
Third quar.	44,601,688·84	39,860,443·97	33,991,737·39
In October.	12,066,671·28	10,655,390 80	7,056,384·95
Ten mos.	$130,360,468·05	124,338,544·53	103,629,638·99

This last statement is unfavorable to the Treasury, and gives occasion for certain foolish talk in Washington about the necessity of increasing the internal taxes to maintain the revenues of the government; but the people will scarcely consider a falling off of twenty or twenty-five millions in the customs receipts a sufficient excuse for adding to the burdens already imposed upon the productive industries of the country. Congress must regulate its appropriations by the amount that can be spared from the Treasury. If the revenues of the government are falling off, the expenditures of the government must be proportionately curtailed, and we must, for the present, at least, practice a little of the wholesome economy which, since the war, we have ceased to regard as either desirable or necessary. If, with such economy, our revenues are still insufficient to meet the legitimate demands upon the Treasury, let the burden fall upon our imports, and not upon our domestic products. Let tea and coffee, and some other articles which have been placed upon the free list to satisfy the foolish clamor of the "revenue reformers" be required to pay a fair revenue duty, and, if necessary, let the duties now imposed upon our chief articles of import be increased, but let us have no more talk, especially in the Treasury Department, of increased internal taxes to support Congressional extravagance.

The extent to which our foreign trade will be affected in the future by the causes which have brought about the marked changes above noted, is an interesting subject for consideration, but one which we shall be compelled to treat briefly. By checking the building of railroads in advance of the requirements of trade, and compelling the abandonment, for a time, of most speculative enterprises, a great deal of labor has been thrown out of employment, and wages would have declined somewhat even had there been no general suspension of manufacturing. As it is, however, the decline has been marked, and extends to nearly all trades. It is doubtful, moreover, if wages will again advance to the high rates paid last year and up to the beginning of the panic. Since the war the labor market has been in an artificial condition, owing to the undue influence of the trade unions While everything of which the value is not determined chiefly by the price of labor, has declined, wages have been steadily maintained in some instances, and steadily advanced in others, Now that wages, too, have fallen, we may be said to have fairly entered upon an era of cheaper prices, and with the near approach of our currency to gold, as regards the purchasing power of a dollar, nothing less serious than another war is likely to put either labor or the necessities of life up to the prices from which they have fallen. Under these conditions, we find ourselves in position to produce more cheaply and more abundantly than before the panic, and with cheaper and more abundant production we shall at once need less from abroad of goods we make at home, and have more of our own products and manufactures for export at prices which will secure us markets from which our manufactures are now excluded. The effect of the collapse of the railroad bubble upon our foreign exchanges cannot be important. Europe, which has taken from eighty to one hundred millions of our railroad securities, will not want any more just now, but with diminishing imports and increasing exports, we have no occasion to trouble ourselves about the liquidation of trade balances. That we can no longer borrow large amounts abroad on doubtful security, will not retard as rapid a progress as is consistent with the maintenance of a good credit and the enjoyment of a general prosperity. Clearly, then, we are not on the road to ruin; and when our commercial and industrial systems shall have recovered from the shock they have experienced, we shall find ourselves richer and more prosperous than before, and without the fear of an ever "impending crisis" before our eyes.

Mr. Bradlaugh as a Labor Reformer.

To accredit Mr. Charles Bradlaugh with the ability to do serious mischief by preaching errors and sophisms to the workingmen, would, perhaps, be to rate him above his value; but that he is sowing seeds which, if they take root in the minds of the working classes, will bring forth tares, no intelligent and thoughtful reader of the very foolish speeches he has delivered in this country can doubt. Mr. Bradlaugh began his career as an agitator of labor reform in a good cause; the notoriety he has gained has made him a demagogue of the cheapest kind, and the sooner he returns to his own country the better for his reputation in this. As a sample of Mr. Bradlaugh's worse than foolish utterances, we quote as follows from his speech delivered last Thursday at the Cooper Institute, in this city:

What I have to talk about to you to-night may be summed up in four words: "High wages; low wages." Low wages mean bad homes, wretched clothing, bad food, and wives not as good tempered as they might be, and there seems to be more enticement at the lager beer and whisky saloons than there is at home. What is the use of preaching temperance to such men? Feed their wives, children, and give them good homes, and then temperance will show itself.

The meaning of this, if it means anything, is that men who earn low wages are morally justified in squandering their earnings for liquor, and leaving their families dependent upon charity for food and clothing, Mr. Bradlaugh does not say so in as many words, but there are many who heard his speech, and who shouted and cheered and applauded when he said anything like the above, who could not fail to construe his words as meaning that discontent justifies them in yielding to the temptations of vice. Again:

I urge that the whole tenure of law is the law of the moneyed and land possessors against the moneyless and the landless. Some persons have spoken against trades' unions. Are they useful, moral, or legal? Yes, I urge that they are all, and in addition not only defensible but commendable, and the legislation which is directed against these combinations is unjustifiable. But every union should be an open one, and not a secret society. I urge that secret societies are blundering policies. Everything done by workingmen should be open to all. It is just like burying your head in the sand and leaving your body exposed. Every trade society ought to be a political organization. (Cheers.) Has labor anything to do with politics? Why, yes, everything; and you have lent yourselves to be political machines while others have played the hurdy-gurdy. (Cheers.) Let the workingmen nominate their president and vote for him. Have an open convention, and if you keep together you can secure all political power.

Of course, the workingmen have a right to elect as many representatives as they can, but to preach the doctrine that they need special legislation of their own making to protect their interests is to preach a falsehood. Class legislation in the interest of labor would be infinitely more dangerous than class legislation in the interest of capital. We want neither, but if we must have either, let it be the latter by all means, for the welfare of capital is dependent upon the general welfare and prosperity, while the welfare of labor, as it is understood by the leaders of the labor movement, means, when reduced to a simple proposition, an equal division of the wealth of the country every Saturday night. What we want in our State and national legislatures, in our high executive offices, and in our municipal and local governments, is honesty, fidelity and economy, and these both labor and capital should unite in securing; but we want no class legislation, and if Mr. Bradlaugh was as well informed and honest as he is fluent in speech, he would have discovered this before he had been a month in the country.

The spectacle of a man of Mr. Bradlaugh's popularity and influence, prostituting his powers of oratory that he may win the noisy applause of the unthinking and the ignorant, is not a pleasant one to contemplate. We have witnessed the same transformation of the philanthropist into the demagogue, in the cases of Mr. Wendell Phillips and others, but it is none the less a pitiable sight, and one to make the judicious grieve. Mr. Bradlaugh came to this country with splendid opportunities of doing good. His fame as a popular speaker preceded him, and thousands of the classes to which his words appeal would have flocked to hear him. What he should have said to the workingmen of the United States is, substantially, this: You have a great country, rich in undeveloped and practically inexhaustible resources; you have political, social and religious liberty, such as no other people enjoy; you have opportunities of self advancement such as are found in no other country of the world. Make the most of these opportunities. Strive to educate and improve your minds; become thorough and skillful in your respective trades; live prudently and practice the virtue of economy; and with industry and thrift, any man who follows an honorable trade may, in a few years, acquire an independence which, in my country, would be considered wealth. If you cannot do this in New York, the whole continent is open to you. Another generation will not see the demand for labor supplied in this country—another century will not see the rich and fertile plains of the West populated so fully that the industrious workingman cannot buy a home of which no one can dispossess him against his will. On every side you see examples, rarely met with in the old world, of men who by industry and thrift have risen from the ranks of the workingmen to wealth, influence and social distinction; the same opportunities are open to you. I do not ask you to be content with poverty, with privation and suffering; but before you complain of your position, make at least one honest and sustained effort to better your condition, and you will find a thousand opportunities to rise, and a thousand friendly hands stretched out to help you, as soon as you manifest a worthy and well directed ambition. But you will gain nothing by cursing your ill fortune nor by envying the good fortune of those who have achieved success. The remedy for the evils of which you complain lies in your own hands, and you may apply it if you will; but not in the hands of those who manage your trade unions, and who seek to gain political office by making you false promises which they well know they cannot fulfill. Had Mr. Bradlaugh told the workingmen these plain and practical truths in his own forcible and eloquent way, he would have done something worthy of his powers, and carried back with him honors and the grateful remembrances of those in whom his words had inspired a new and worthy ambition. As it is, he has won the unsavory name of demagogue and, if his conscience is as tender as his tongue is loose, the consciousness of having done all the mischief in his power and neglected doing the good he might have done. From such labor reformers the working classes may well pray to be delivered.

The Condition and Prospect of Railroad Traffic.

The *Railroad Gazette*, an able exponent of the interests it represents, thus concludes an article on the condition and prospects of railroad traffic:

"We conclude from the facts which are now attainable, that, so far as the traffic from agricultural products is concerned—which is the chief traffic of our railroads—it is hard to see how it can be less for the season than heretofore; that, from present appearances, farmers—whose demand chiefly rules trade—are likely to consume nearly or quite as much as last year; that the great fall in prices, and in the prices of railroad supplies particularly, makes the cost of working railroads less than heretofore; and, finally, that the appreciation of the currency has had a considerable effect in raising the value of the dollars that may be divided as net profits, so that so large an amount is not now necessary to keep up the rate of profit. This may be balanced shortly by a fall in prices of transportation, but it has not been so far. Altogether, we cannot but believe that the outlook is favorable for the lines with established traffic, whatever may be the returns at the present moment."

The above conclusions find abundant statistical confirmation in the following statement of the gross earnings of some of our principal railroads for the past ten months, which we gather from authentic sources:

RAILROAD EARNINGS FOR TEN MONTHS ENDED OCTOBER 31ST.

	1873.	1872.
Atlantic & Great Western	$4,371,540	$3,276,742
Atlantic & Pacific	1,093,404	930,772
Central Pacific	11,606,804	10,638,030
Chicago, Danville & Vincennes	586,905	515,473
Clev., Col., Cin. & Ind.	4,017,985	3,667,506
Chicago & Northwestern	11,486,361	10,344,897
Erie	16,436,529	15,185,933
Illinois Central	6,813,564	6,576,838
Indiana, Bloomington & Western	1,394,026	1,131,147
Kansas Pacific	3,001,692	3,079,602
Lake Shore & Michigan Southern	16,211,478	14,410,970
Milwaukee & St. Paul	7,426,681	5,747,114
Pacific of Missouri	3,045,298	2,916,408
St. Louis, Alton & Terre Haute	1,168,765	1,170,198
St. Louis, Alton & Terre Haute branches	505,059	414,511
St. Louis & Iron Mountain	1,949,796	1,841,863
St. Louis, Kansas City & Missouri	2,298,604	2,347,254
Toledo, Wabash & Western	4 961,339	4,988,740
Total	$99,369,399	$92,682,449
Increase in 1873	6,586,950	

These figures are important as affording trustworthy data from which to estimate the probable consumption of iron by the railroads next year. With steadily increasing earnings, diminished expenses, owing to the cheapening of materials and labor, and rapidly increasing traffic, demanding increased facilities for its handling and transportation, the railroads will next year be in a position to take as much iron as they would under any circumstances require, and, as we showed in a previous article, the probable requirements for relaying alone will require an amount of rails within a few thousand tons of the entire product of our rail mills in 1872. Should there be even a small mileage of new road built or completed—and no one can suppose that we will not do something in this line next year—makers of iron rails will not lack orders. We believe, however, that the time is past for making cheap and inferior railroad iron in any considerable quantities. The consumers of such iron are the class of speculative railroad builders who have suffered most heavily from the panic, and the roads in which cheap rails of poor quality have been laid are not likely to prove such valuable properties as to tempt capital into the construction of others on the same plan. Experience has proved, moreover, that the best rails are the cheapest, and our American rail makers will soon discover, if they have not learned it already, that the surest and best way to secure a monopoly of the American market when the demand again becomes active, is to produce the best rails they can at the lowest prices at which they can be made with the closest and most systematic economy in every process of manufacture. For the next five years, at least, the demand will be for good rails, if not exclusively for the very best in the market, and we imagine that the profit of our rail mills will depend, in a great degree, if not wholly, upon the quality of their product.

American Hardware in Canada.

A few weeks ago we published an editorial article on the Canadian market for American hardware, which attracted much attention. Having gained our information in Canada, and from Canadian merchants whose shelves were loaded with goods bought in this market, we knew whereof we spoke; but as this trade is of comparatively recent growth, we were unable to obtain at the time any official statistics, showing the proportion of American goods brought in to the total hardware imports of the British Provinces. This information has since been supplied, and in our report of the general hardware market on another page will be found a statement compiled from the official statistics of the trade and navigation of the Dominion of Canada, by which it appears that the total value of the imports from all countries of cutlery, Britannia and other metal wares, spades, shovels, hoes, spikes, nails, stoves, castings, and other hardware, for the fiscal year ended June 30, 1872, was $3,819,947, of which $1,619,278, or about forty-two per cent., were manufactured in the United States. We refer our readers to the statement mentioned for details.

That we have in Canada an important and profitable market for our manufactures of iron, this statement conclusively proves. The field is one in which comparatively few of our manufacturers have sought trade, however, and until an effort is made to control the market for our manufactures, we shall not know to what extent it is in our power to monopolize it. Speaking of the loss of trade with the Provinces, the London *Ironmonger* says:

No one can blame our Canadian fellow subjects for doing exactly what we strive to do ourselves—buy in the best market, securing first-class articles at lowest prices—but we much question if they make at all times really good bargains, when they fancy they do simply because they pay less for what they want than for what they can obtain from English makers. We will not dispute that the time may come when they will be able to fairly compete with us in America, even as to quality, but it will be some time yet. Our Canadian friends put before us a formidable statement we admit, but it must be borne in mind that the home demand has been so great that we have been compelled to let America have the field almost undisputed. There has, therefore, simply been no competition in the matter, as the Canadians have been obliged, as a visitor from the Dominion observed the other day, "to take what they could get."

It is natural, perhaps, for a British journal to take this view of the case, but lest American manufacturers should be deceived into supposing that they have, at most, only a temporary advantage in the Canadian markets, we will say that the testimony of dealers in districts where American goods have been introduced is that they are more saleable than those of British make, being lighter, stronger in proportion to weight, and better finished in proportion to cost. Among the lines of American goods with which those of British, French and German make cannot compete, either in quality or price, may be mentioned builders' and saddlery hardware of all kinds, real and imitation bronze hardware, cheap table and pocket cutlery, metal house furnishing goods, silver and nickel plated wares, scissors and shears. The only reason they have not practically excluded competing goods from the Canadian market is that the field

has not been canvassed as fully as it should have been, and that, in many districts, dealers are still ignorant of the advantage to be gained from purchasing their supplies on this side of the line. Our manufacturers can safely canvass the Provinces with samples of any kind of shelf goods, and, beside underbidding the agents of foreign manufacturers, can deliver goods with such facility that they could be sold at a profit before goods ordered abroad could reach Montreal. We urge these facts upon the attention of hardware manufacturers, because we believe they are not yet generally understood and appreciated; and our statements need no other confirmation than is found in official statistics showing that, while comparatively few of our manufacturers have made an effort to secure Canadian trade, we send to the Dominion more than forty per cent. of the manufactures of iron received from all countries.

The German Iron Trade.

The British consul at Bremen, Mr. Ward, has collected some interesting facts respecting the iron trade of Germany, and embodied them in a short official report which contains much valuable statistical information. The following are given as the correct figures of imports and exports of pig and manufactured iron from 1846 to 1870:

	Imports.	
Average of five years.	Pig iron. Centners.	Manufactured iron. Centners.
1846-50	1,669,777	674,953
1851-55	2,299,182	364,359
1856-60	3,719,668	711,683
1861-65	2,922,521	352,356
1866-70	3,336,981	379,143
Year.		
1866	2,809,370	416,984
1867	2,343,216	278,695
1868	2,650,720	414,558
1869	3,794,915	418,709
1870	4,586,684	336,768

	Exports.	
Average of five years.	Pig iron. Centners.	Manufactured iron. Centners.
1846-50	18,757	59,143
1851-55	79,039	113,379
1856-60	131,641	217,043
1861-65	222,179	278,131
1866-70	1,439,678	1,009,564
Year.		
1866	412,113	362,405
1867	592,360	522,469
1868	1,960,386	1,241,077
1869	2,037,142	1,546,682
1870	2,196,490	1,375,189

Mr. Ward states that during the past thirty years the annual German consumption of iron per head of population, has increased about 300 per cent., and may now be estimated at 67 lbs. It is to be regretted that the statistics of imports and exports have not been brought down to the end of 1872, in order that the effect of the war with France, and of the subsequent rapid expansion of the railroad system and development of manufacturing industry, might appear: but official statistics are never considered fit for publication until they have an ancient and musty flavor, and have lost some, if not all, of the interest they would have had when fresh for those to whom statistics are most useful.

Is the Centennial movement in danger of ending in failure? We had supposed not, but the Philadelphia *North American*, which ought to know what it is talking about, says:

> No exertion has been spared to raise adequate funds by private subscription, and so far as the city of Philadelphia and the State of Pennsylvania are concerned the response, both corporate and individual, has been prompt and generous. Outside of these limits professions of sympathy and patriotic interchange of congratulations upon the approach of so auspicious an event have been frequent and no doubt earnest, but the treasury of the Commission has found no substantial addition. With a continuation of the tide of prosperity which had flowed through the country since the close of the war, it is possible that the generous impulses of the people would have induced a very liberal personal subscription to this great enterprise. Its sudden check and threatening ebb leave room for no such hope; for while we may still look for occasional contributions, it would be more than folly to expect an increment of millions at a time when each man trembles lest his own may be the next reported case of financial embarrassment or ruin.

Now, we would ask our neighbor whether it is not putting the case a little too strongly? It is easy to understand why, at a time like this, subscriptions to the Centennial fund should come in slowly, if at all; but why should we think the prosperity of the country is at an end for the present, or that next year our people will not be in a position to gratify any generous impulses they may feel? We quite agree with the *North American* that a liberal appropriation will be necessary to insure the success of the enterprise, but should that assistance be rendered too soon, the probabilities are that the people would have no more "generous impulses," and that Congress would have to pay for everything. We are by no means disposed to give up the case as hopeless so early in the day. Congress will, undoubtedly, have to do considerable toward meeting the expenses of the undertaking, but a large sum has already been subscribed, chiefly in Pennsylvania, and we do not think that amount can have yet been exhausted. True, we have no time to lose, for 1876 will be upon us before we are ready for it; but, unless the finances of the Centennial Commission are in a more desperate condition than we think, the wisdom of proclaiming that a large appropriation from Congress as early as possible during the winter session is the indispensable pre-requisite of success, is at least open to question.

The American Institute Exhibition.

II.

The annual exhibition of the American Institute, which closed on Saturday last, if not entirely creditable to a great city like New York, was not without interest for the appreciative visitor. There was the usual display of old standbys that one sees at every industrial exhibition and fair from Maine to Texas, the usual preponderance of goods entered merely for advertising purposes, the same countless variety of things in which no one but the exhibitors could reasonably be expected to feel any interest, and the customary trafficing in patent nick-nacks of various kinds, which, if not prohibited, ought to be regulated by more stringent rules than the managers of the American Institute consider it necessary to enforce; but, as a whole, it is probable the exhibition was satisfactory to the great mass of visitors that daily and nightly thronged the Rink, and however unfavorably it may compare with those of other cities, it cannot, therefore, be pronounced a failure or a disappointment, although the impartial critic would find it rather difficult to manifest much enthusiasm over the exhibition.

In a previous article we noted some of the more interesting and important exhibits in the mechanical department, some of which merit more extended notice. Among these are the steam vacuum pumps exhibited by Mr. Wm. Burdon, of this city and Brooklyn.

We also find that in our previous article we made the mistake of naming the Billings & Spencer Co. as the exhibitors of the drop hammers. The drop forgings were made by the Billings & Spencer Co. with their hammers, but the hammers are made by the Messrs. Chas. Merrill & Sons, of No. 556 Grand street, N. Y. In order to make the exhibition of greater interest, Messrs. Merrill erected a blacksmiths' forge and forged some of their regular work every day and evening. The principle on which these hammers are constructed is novel, and, we should say, entirely practical.

To the hammer which moves between the uprights a board or belt is attached. This passes between two smooth friction rolls, which revolve toward each other. The pulleys are on separate shafts, each driving a roll, and are driven from one driving shaft by cross and open belts. When the rolls are closed together and pressed against the board, the friction of the rolls on each side of the board raises the hammer, and when the rolls are separated the hammer is free to fall. The shaft of one of the rolls runs in eccentric sleeves, placed in square boxes, which sleeves, when revolved a small portion of a circle, move the rolls nearer together or separate them. The drop rod is attached to the arms of the eccentric sleeves, and the falling of the rod partially revolves the eccentric sleeves, which brings the rolls together. When the rod is up the rolls are open. These rolls have no gear between them, and by means of the handle and rod on the left side, which is attached to the eccentric sleeves, the operator can open or close the rolls at pleasure. Thus the hammer can be made to fall from any hight. If the rolls are only pressed slightly together by the operator, the hammer will be raised slowly, and while falling it can, by the same action, be made to fall slowly; or, by pressing them closer together, it can be stopped before it reaches the anvil, and made to ascend. This arrangement makes it a superior jobbing hammer, not unlike a single acting steam hammer.

It is made to opearate automatically by placing the dog on the drop rod, at any desired point. When the hammer ascends, a projection on the hammer strikes the dog, lifts the rod, which opens the rolls, when the hammer will fall. The rod, when lifted, is held up by a simple device at the lower end, which is tripped when the hammer strikes—allowing the drop rod to fall, which closes the rolls, and the hammer ascends to lift the rod as before, when the hammer will again fall. Thus it will continue to move, like a trip hammer, until stopped by the operator raising the handle at the side. If the catch on the right hand is placed just below the dog on the rod, the hammer will fall and rest on it until tripped by the treadle, when the hammer will fall, strike a clean blow, raise and be caught at the same place, to remain until tripped again. Both the dog on the rod, and catch on the side, are adjustable—which enables the operator to get any desired blow. These hammers have received several premiums at different industrial exhibitions, and are in use at the United States armory at Springfield.

Among the engines not mentioned in our previous article, the most simple, compact and practical are those exhibited by Messrs. Whitman & Burrell, of Little Falls, N. Y. These are manufactured under Kipp's patent, and are of 2, 3, 5 and 7 horse-power, respectively. The exhibitors also show a portable boiler, and a lard or fat renderer and boiler. The Kipp engines, of which this firm are exclusive agents, are probably the simplest, most compact, and, in proportion to size, the strongest ever made. The base, cylinder, frame and arms are cast in one piece, and their compactness may be judged from the fact that a 2 horse-power engine takes up only 12×15 inches space, and weighs only 165 lbs. The Andrews steam boilers and tanks, exhibited in connection with their engines, are made of ¼ inch wrought iron, with iron heads of ⅛ inch thick, wrought iron bands ⅝ inch thick around them, and all thoroughly riveted. They are peculiar in construction, being, in fact, one complete double boiler within another, the two communicating one with the other. The fire space is inside of this, thus giving an extraordinary amount of fire surface in proportion to the size. It is set on a cast iron base, making it as secure from fire as an ordinary stove. Weighs from 500 to 1800 lbs., and is therefore portable, and can be used in the open air, or in any building where there is a flue sufficiently large to receive the smoke pipe. As the boilers are fed directly from the tanks, no pumps or injectors are needed. When the tank is filled, it is made air-tight by closing the faucets, and the feed to the boiler is regulated by letting steam in above the water as often as may be necessary.

An important exhibit, not mentioned in our first article, is Bradley's cushioned hammer, which has already received the highest commendation from manufacturers using it. This hammer, with which most of our readers are doubtless well acquainted, is adjustable in line of action, length of stroke, rapidity of motion, and weight and force of blow.

This hammer is made of iron, except the helve. The anvil and anvil block are cast iron, made separate and adjustable. The anvil block has a separate foundation, independent of that of the main bed, but each is so united as to transmit nearly the entire jar from the stroke of the hammer to that of the anvil alone. The main bed and its uprights resting upon a foundation separate from that of the anvil, relieves it materially from the concussion of the hammer. The helve is nicely balanced and swings upon two adjustable hardened steel centers, and is put in motion by the use of an adjustable broad steel eccentric operating in connection with the yoke and rubber cushions, the length of stroke being governed by the adjustable eccentric; the force and power of the blow is greatly influenced by the reactive and united action of the cushions. So harmonious and perfect is this combined action upon the motion of the helve that an observer, holding his hand upon the working parts when under the most rapid and violent motion, can scarcely feel to identify the strokes of the hammer; the action of the helve in the use of the yoke and cushions is as flexible and near like that of the smith's arm as the results of any artificial method can produce. Such a thing as breaking of the helve never occurs, and by using a broad steel eccentric it does away with friction and heat.

The adjustible cushion, at the apex of the standard, is to assist the lower rear cushion in heavy work, and also check the upward motion. On giving tension to the cushion in the yoke, care should be observed to have equal adjustment by the set screws on the top of the yoke; but should one screw be run down lower than the other, thereby twisting the yoke, there can be no bind or friction, as the universal joint connection regulates the result upon the broad eccentric below, leaving it to work free of the incumbrance.

The power is applied and regulated in the use of a foot treadle running around the bed of the hammer in such a manner that the operator can stand in front or on either side. A gentle pressure of the foot upon the treadle brings the tightener in connection with the belt upon the pully, and thus varies the stroke in proportion to the pressure applied; on removing the foot, the treadle flies up, bringing the break upon the balance wheel, stopping it instantly, leaving the hammer up, as it cannot stop with the dies closed, and which is an important feature.

One of the objects of interest in the mechanical department is Brayton's gas engine, which is a novelty and merits careful attention. This engine was so well described by Prof. R. H. Thurston, of the Stevens Institute of Technology, in a report made, after careful examination and tests, in May last, that we quote therefrom in preference to giving a description of our own. Prof. Thurston says:

> In construction, this engine resembles closely the steam engine; its cylinder and piston, its valve gear and its connections being essentially similar. The principal difference consists in the addition of a compressing pump and a reservoir, for the purpose of compressing and of retaining a quantity of combustible gases, mixed with a proper proportion of air for its complete combustion, and at a pressure exceeding that which it is proposed to have exerted in the working cylinder. The reservoir, here, has precisely the same relation to the engine as does the boiler to the steam engine. A "jacket" surrounds the cylinder, through which water is kept constantly circulating. The comparatively low temperature thus secured in the walls of the cylinder allows of the adoption of the same construction of piston, with **its metallic packing rings**, which has become standard in the steam engines. It also permits the same methods of lubrication. A diaphragm, composed of several layers of wire gauze, similar to that which gives the Davy safety lamp its security, is placed at the opening through which the gaseous mixture enters the cylinder. This is of more closely woven material than that used in the safety lamp, as well as of several thickness instead of but one, and is, probably, an effectual preventive of ignition of the mass of gas enclosed in the reservoir. A similar diaphragm, but of much smaller area, allows a very small quantity of gas to stream continuously into the cylinder, and as this current is not interrupted by the closing of the induction valve, its little jet burns constantly, and is always ready to ignite an entering charge.
>
> Should the flame, by any unanticipated accident, reach the reservoir, the expansion of the confined gas, which is a consequence of its explosion, simply opens the safety valve, which is given considerable area, and no harm is done. The walls of the reservoir are made very strong, and possibly might successfully resist the great pressure, even were no safety valve provided, since such a pressure has been often sustained without injury in chambers of the size of that here referred to. The agent states that these reservoirs are tested by a pressure of 1000 pounds per square inch.
>
> Where liquid hydro-carbons are used, in place of gaseous fuel, the reservoir is filled with air simply, and the carburation takes place between the reservoir and the working cylinder. It is thus possible to work with but a very minute quantity of the fluid in the apparatus at any one time.
>
> The induction valve is completely protected from the action of the hot gases by the safety diaphragm, which is interposed between it and cylinder. The eduction valve is unprotected, and, to avoid its serious injury, is made of well fitted steel. The operation of the engines is precisely similar, in the action of the engine proper, and in the distribution of pressure in its cylinder, to that of the steam engine. The action of the impelling fluid is not explosive, as it is in every other form of gas engine of which I have knowledge.
>
> Upon the opening of the induction valve the mixed gases enter, steadily burning as they flow into the cylinder, and the pressure, from the commencement of stroke to the point of cut-off, as is shown by the indicator diagrams, is as uniform as that observed in any steam cylinder. The *maximum* pressure exerted during my experimental trial, and while the engine was driving somewhat more than its full rated power, was about 75 pounds per square inch at the beginning of the stroke, gradually diminishing to 66 pounds at the point of cut-off, where the speed of piston was nearly a maximum, and thence declining in accordance with the law governing the expansion of gases.
>
> Complete combustion is insured by thorough mixture. This is accomplished by taking the illuminating gas and the air, in proper proportions, into the compressing pump together, and the mixture here made becomes more intimate in the reservoir, and in its progress toward the point at which it does its work.
>
> The constantly burning jet, already described, insures prompt ignition on entering the cylinder.

Prof. Thurston gives the following as his conclusions:

1st. That the method of utilizing the power obtainable from the combustion of gas, as here adopted, is, so far as I am aware, quite new, and is most advantageous in its results.

2d. That, in this engine, combustion is proven, by the application of the indicator, not to be explosive, but to occur in a progressive manner, developing a very uniform pressure, never equaling that in the reservoir, and varying in the driving cylinder precisely as does steam pressure in the cylinder of the steam engine.

3d. That this method of utilizing gas power is an exceptionally economical one.

4th. That the liability of explosion within the reservoir, as well as of any danger arising from such explosion, should it ever occur, is very carefully provided against.

5th. That the interior surface of the cylinder presented no evidence of overheating, or of injury from any cause at the termination of my experiments.

6th. The same remark applies to the safety fuses or diaphragms.

7th. The valve gear of this engine, with its variable cut-off, is an effective and valuable feature.

8th. That the mechanism and general design of the later styles of this engine are excellent.

The engine seems to be especially adapted for use when small power is required at intervals. It is put into full and instantaneous operation by the application of a match, and stopped as easily by the turning of a cock—costing nothing when not running.

Another engine, not previously noted, is exhibited by Messrs. Osterheld & Eickemeyer, of Yonkers, N. Y., by whom it is made under Mr. Eickemeyer's patent. This is an expansive working steam engine, and the advantages claimed for it are—perfect valve action combined with the greatest simplicity of working parts, great durability, compactness, and very economical use of steam caused by accurate expansive action. The inlet and exhaust of steam are regulated with the greatest possible precision, without the use of any delicate mechanism; and perfect expansion is produced with any length of stroke. The balanced piston, of extreme length, furnishes the largest possible wearing surface, while its motion is easy and free. The crank is attached to the piston rod close to the cylinder head, and the crank shaft is consequently nearer to the cylinder than in most engines. On these improvements the inventor bases his claim to a greater economy than has been attained in other engines of the same power and adapted to the same uses.

The Freeland Tool Company, West 34th street, N. Y. exhibited several fine engine tools of superior finish and apparent excellence.

Mr. J. W. Meredith, a saw gumming machine, entirely of cast iron. This machine has an attachment for holding upright and circular saws, so as to cut any tooth desired. The punch is so arranged as to give two inches wear, and can be kept in order with but little trouble.

Mr. Wm. Hamilton, of Erie, Pa., a "continuous self-feeding permeator" for steam engines.

Mr. T. F. Rowland, a working model of a coal carrying and gas retort charging machine.

Mr. Edward J. Worcester, of Worcester, Mass., a self-feeding upright drill.

Mr. W. Bailey Lang, a cast steel locomotive tire, rolled at the Jersey City Steel Tire Works; also a bloom from which tires are rolled, from the works of Messrs. Cammell & Co., Sheffield.

The Biddle Mfg. Co., a card of drop forgings and cases of wire nippers, pincers, and cutting tools; plumbers' elbows; a self-feeding power drill of three speeds; hand shears for cutting plate iron; a bar cutter and punching press, and a power shears for cutting round and square bar iron.

Messrs. Wiley & Russell, a bolt cutter, set screw and machine drill combined.

Mr. James Bogardus, several sizes of the universal eccentric mill.

Mr. E. M. Boynton, a fine card of the well known lightning saws, large and small.

Mr. R. Hoe, saws, large and small, of various patterns.

The Stephens Patent Vise Company, parallel vises with swivel, taper, table and pipe attachments.

The E. P. Gleason Mfg. Co., a case of Hotz's patent faucets.

Messrs. P. W. Pratt, Abington Center, Mass.; L. B. Tupper, New York; and H. Ryder, Boston, patent grate bars.

There was a fair display of agricultural machinery, among which we notice no very important novelties; a good variety of competing sewing machines and many mechanical devices and ingenious inventions which we should gladly notice did our limited space permit.

High Speed Steam Hammers.

On our first page we present illustrations of a high speed steam hammer built by Messrs. Gustav Brinkmann & Co., of Wiltin-on-the-Rhur, Westphalia, and exhibited at the Vienna Exposition. Figures 1 and 2 show, respectively, the front and back elevations. As will be seen from the engravings, for which we are indebted to *Engineering*, the anvil bed, or stock, is used as bedplate for the hammer, an arrangement which is adopted generally by these manufacturers for high speed hammers, except in the case of tilting hammers for steel, the anvils of which are, without exception, made independent of the bedplate of the hammer.

Another peculiarity of the construction, as seen from the engravings, is the mode of fastening the cylinder and of the guide bars to the standards, which is not effected as usual by means of bolts, but by wrought iron rings shrunk over circular projections, one-half of each of which is cast to the cylinder or guide bars respectively, whilst the other half forms part of the standards; when the latter and the cylinder and guide bars are respectively fitted together correctly, these projections form circular discs over which the wrought iron rings are shrunk.

The hammer is worked by two levers, as shown in the front view, one of these levers enabling the admission of the steam to be regulated, whilst the other is used for altering the stroke and the force of the blow. The lever for regulating the admission of the steam can be fixed at any position, and its lower end is connected with a second lever, to which a rod for the working of the admission valve is attached. The one end of the lever for the alteration of the stroke can be fixed at various positions by a spring and a notched segment, whilst the other end is fixed to a short shaft passing through the side bracket of the cylinder, as shown in the engravings. From the back view of the latter it will be seen that this short shaft, which is cranked on this side of the hammer, carries a double lever, the two ends of which are connected with the valve rod and the valve gear respectively. The latter consists of a lever fastened to the ram, and a rod connecting this lever with one end of the double lever.

The admission of the steam into the cylinder is regulated by a piston valve, the position and travel of which depend upon the position of the cranked part of the shaft passing through the side bracket of the cylinder. It is evident, therefore, that any position of the lower end of the long lever (see front elevation) in the notched segment, must correspond with a certain position of the cranked part of the horizontal shaft, and thus also with a certain position and travel of the piston valve, upon which the stroke of the piston depends. The exhaust steam passes back again through the piston valve, and thence from the steam chest through a short tube (see back view) into the top side of the standard, from where it escapes into the exhaust pipe.

The weight of this hammer is 8 cwt., the cylinder has a diameter of 11 in., and the longest stroke is 15·5 in., allowing of forging iron pieces 6 in. to 7 in. high, and steel pieces 5 in. high. The average number of blows per minute is 200, and the whole hammer, with bedplate and anvil, weighs 8 tons; without the two latter 3 tons 17 cwt. The distance between the two standards at the bottom is 4 ft. 5 in., whilst the total hight of the standards from the bedplate is 7 ft. The piston rod is made of crucible cast steel, has a diameter of 5⅛ in., and is formed in one piece with the piston and ram, whence the cover of the cylinder has to be made in two pieces. This hammer has been working at the Exhibition, and the adjustment of the stroke and of the blow has been shown to be very readily effected. We should mention, in conclusion, that the workmanship of the hammer is very creditable to the manufacturers, who are building hammers on this system up to 7 tons.

The Ohio Valley.—The Ohio Valley *News* says: The situation in the manufacturing establishments of Martin's Ferry, at present, is not at all discouraging, but rather hopeful in comparison with that of many other places. All our manufactories are running their full force of hands, except the blast furnace, which blew out a few weeks ago for repairs, and the Ohio Valley Agricultural Works, which, owing to an accident to the boiler rendering it impossible to run the entire machinery, makes it necessary to cut down the force of laborers. The "blowing out" of the blast furnace was an absolute necessity, it having been in operation over three years and a half—the longest run on record. The accident to Mr. Spence's boiler was unforeseen, and of course unfortunate. But it will, we understand, be repaired as soon as possible, when work will be resumed as usual. In the mean time Mr. Spence is pushing things as vigorously as possible with a portable engine, and we are assured that he is fully able to carry through all the work he has contracted for, which, by the way, is no small amount. Some of the shops have made satisfactory arrangements with their workmen to pay off by half cash. The glass house, which has been running but two furnaces for some time past, will start the fire under the third by next week. Work is still in progress at the Ætna Iron Works below town, and the Ohio City Iron and Nail Works above town. We hope that the proprietors of all our manufacturing establishments will have the backbone and grit to hold on as they have been doing, until the financial sky is cleared of panicky clouds. The "silver lining" can now be seen around the Treasury vaults at Washington and the United States Mint at Philadelphia. Confidence, and a little help here and there where needed, will soon spread it over the whole canopy, and the smiling faces and happy hearts of gladdened millions will greet it.

The Situation in Philadelphia.—In a review of the situation in that city, the Philadelphia *Inquirer*, of the 8th inst., says: For the past few days our reporters have been actively endeavoring to glean accurate information from all sources upon that important matter, and the result warrants the remark that, although things look unfavorable at present, there is every reason to believe they will not long remain so. Money is every day becoming more plentiful, hope and confidence are returning, and even those persons who are suspending operations are, in a majority of instances, of the opinion that these suspensions will be but temporary. It certainly is not so bad as many are disposed to paint it. There are, it is only too true, a large number of people out of employment in this city, but, compared with the number who still retain employment, they are as but a drop in the bucket. Moreover, it is always customary at this season of the year for certain kinds of mills and manufactories, foundries, etc., to either materially decrease the number of their hands or to shut down completely for a season. It is probable that, if it were practicable to make a canvass of the number of persons out of employment at present, and compare it with the number out of employment at this time last year, the increase would be astonishingly lower than it is generally supposed it would be. There are certainly a great many persons out of work in the city, but it should not be forgotten that there is an immense legion still employed. In Kensington there are now over 3000 men, women, boys and girls out of employment, who are deprived of work this fall, presumably through the stringency.

Trade Report.

Office of THE IRON AGE.
WEDNESDAY EVENING, Nov. 19, 1873.

The past week has been comparatively uneventful in Wall street. The unfavorable news of threatening difficulties with Spain has checked the general improvement, and advanced the gold premium to 110, but nothing more. The banks have gained steadily in strength, and now hold but little less than $28,000,000 legal tender notes. They have also reduced their loan certificates about $7,000,000, having less than $19,000,000 outstanding. The minimum discount rate of the bank of England is still 9 per cent., but in the open market it has fallen to 6 @ 7 per cent. In this market the rate for money on call has been 5 @ 7 per cent., with 12 per cent. as the lowest quotation for prime mercantile paper.

The gold market has fluctuated considerably, partly because of rumors of war and partly because of the advance in foreign exchange, which went as high as 107 for 60 days and 109 for short sight. The following shows the daily range of the premium:

	Highest.	Lowest.
Thursday	108¼	107¾
Friday	109⅞	108¼
Saturday	110	108⅝
Monday	109⅞	109¼
Tuesday	110¼	109¼
Wednesday	109⅞	109¼

The stock market has improved in tone since our last report, with principal dealings in Lake Shore, Western Union, New York Central, Union Pacific and Pacific Mail. The bond market has also improved, and desirable railroad mortgages are in better demand. The highest and lowest of to-day's quotations on the Stock Exchange, and the closing prices of United States Bonds, are given below.

The following tables show the foreign trade movement for the week:

IMPORTS.

	1871.	1872.	1873.
Tot. for week..	$4,653,692	$5,717,907	$5,762,089
Prev. reported..	331,383,727	377,776,392	343,488,769
Since Jan 1....	$338,993,409	$383,494,299	$348,250,858

Included in the imports of general merchandise for the week are:

	Quant.	Value
Anvils	325	$4,207
Brass goods	11	1,445
Bismuth	2	1,107
Bronzes	59	11,596
Chains and anchors	113	7,208
Copper		7,173
Cutlery	80	30,722
Guns	145	8,234
Hardware	63	6,469
Iron, pig, tons	167	5,378
R. R. bars	6,987	134,715
Iron cotton ties	1,281	4,846
Iron tubes	200	1,171
Iron, other, tons	444	10,929
Lead, pigs	3,516	23,658
Metal goods	199	27,981
Nails	36	559
Needles	7	4,609
Old metal		2,144
Platina	2	6,161
Per. caps	3	651
Saddlery	19	3,476
Steel	3,030	31,003
Tin, boxes	7,029	60,678
Tin, 1821 slabs	174,191	46,788
Wire	507	15,245
Zinc	111,145	8,266

EXPORTS, EXCLUSIVE OF SPECIE

	1871.	1872.	1873.
For the week	$4,793,905	$5,365,829	$7,603,599
Prev. reported	204,847,327	199,767,701	257,589,247
Since Jan. 1	$209,641,232	$205,133,530	$265,192,846

EXPORTS OF SPECIE.

Total for the week	$1,084,945
Previously reported	44,035,543
Total since January 1	$45,090,488

Government bonds closed as follows:

	Bid.	Asked.
U. S. 1881s, reg	113¾	114¼
U. S. 1881, c.	114¾	114¾
U. S. 5-20, 1862, reg	108¾	109¼
U. S. 5-20 1862, c.	108½	109
U. S. 5-20 1864, c.	109¼	109¾
U. S. 5-20 1865, c.	109¾	110¼
U. S. 5-20 1865, c., Jan. and July	112⅝	113
U. S. 5-20 1867, c.	113¾	114
U. S. 5-20 1868, c.	113¾	114
U. S. 10-40 reg	107	107¾
U. S. 10-40 c.	107¼	107¾
U. S. Currency Pacifics	110	110¼
New Fives, 1881	109¼	109¾

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated	88¼	88⅛
Lake Shore	66¾	66⅜
Rock Island	88¾	87¾
New Jersey Central	92	91⅝
Del., Lack. and West	89¾	89⅜
Wabash	40⅜	39⅝
Western Union Telegraph	60¾	57
Northwestern	40¾	38¾
Northwestern, Preferred	62¾	61
Milwaukee & St. Paul	30¼	28½
Milwaukee & St. Paul pref.	53½	53
Pacific Mail	28	27¾
Erie	42¼	40¾
Ohio & Mississippi	24½	23
Union Pacific	21½	19¾
C. C. & Ind. Central	19¾	19⅜
Hannibal and St. Joseph	22	21½
Consolidation Coal	44	44

GENERAL HARDWARE.

The Montreal *Monetary Times* recently contained an article headed "Our Supply of Hardware," containing the following official figures of the imports of Hardware into Canada, and making some sensible remarks, which we quote. The article says: "It appears quite evident that the Hardware manufacturers of the United States are finding a market for their goods in Canada to a very large extent, and are, in fact, cutting off the English trade in a great measure. This fact is made apparent by the following figures transcribed from our trade and navigation returns for the fiscal year ended June 30, 1872:

Articles.	From United States.	From other countries.
Cutlery	$64,624	$214,869
Britannia and metal ware	19,034	6,657
Spades, shovels, hoes, etc	50,773	29,640
Spikes, nails, etc	41,544	71,205
Stoves and other castings	149,735	121,249
Other hardware	1,293,568	1,727,049
Total	$1,619,273	$2,200,669

"About 42 per cent., therefore, of these articles is obtained from the United States. Reasons for this are not difficult to discover. One is that British manufacturers do not really adopt the latest improvements in the manufacture of a numerous class of articles in this line. To us, however, it matters little; our importers buying, of course, where they can get the best article for the least money; and if United States manufacturers can outstrip those of Great Britain and cut them out of this market, that is their affair and not ours. What we are much concerned in is the development of this class of manufactures among our people. We have the best of ore in abundance, and every other requisite but, perhaps, the enterprise. It is time we ceased to export iron ore in such large quantities, and thus pay several profits to have the iron brought back here for consumption, instead of doing in some measure as we have done with cheese, which we a few years ago imported largely from the States, but are now competing with that country in the English market in the sale of the same article of our own production." Some remarks on this subject will be found on our editorial page.

There is little change in the state of trade this week. We believe business for the latter half of the month will turn out better than that for the first half, but reports are so various that it is impossible to make any general statement which will apply to all.

The Russell & Erwin Mfg. Co. have just added to their line of Steel Keyed Pad Locks a 2½ inch Lock, with fancy bushing, 12 changes. It is designated as No. 1205, and is the same shape as No. 205. The list price is $4 per dozen with one key and $6 with two keys. Watrous' Ship Augers are now quoted discount 15 per cent., instead of 10 per cent.

Horace Durrie has taken the agency for the Pioneer Flax Mills, manufacturers of Flax Twines, as is indicated by the following circular:

We have appointed Horace Durrie, 97 Chambers street, New York, our agent for sale of our Twines, and a full line of our goods will always be found in his store at our lowest factory prices. BENTLEY & GERWIG.

NEW BRIGHTON, Pa., Nov. 15, 1873.

Mr. J. C. McCarty, who has heretofore had charge of the Empire Twine business, will in future give his particular attention to the Pioneer goods.

The Woods Cutlery Company have issued the following circular:

OFFICE OF WOODS CUTLERY COMPANY.
ANTRIM, N. H., Nov. 1, 1873.

To our Patrons: Our rapidly increasing trade has made it imperative for us to establish headquarters in Boston, from whence goods can be shipped more promptly, and at less expense to dealers than from the factory; we have therefore appointed Messrs. Minot & Co., Franklin street, near Oliver street, our sole agents for the New England States. We shall withdraw our traveling men from the road, and desire you to give Messrs. Minot & Co. a continuance of the patronage you have so liberally bestowed upon us. Truly yours,
WOODS CUTLERY CO.
D. H. GOODELL, President.

This company reports that their sales for October were larger than those for any previous month. Geo. B. Walbridge continues to represent them, and carries a stock of their goods, as heretofore.

Trade in foreign Hardware shows no sign of improvement, and the conclusion seems to be generally accepted that the present condition of affairs will be the rule until the ensuing year brings with it the usual demand for spring trade. There are no changes to note in prices, and the demand, which is very limited, is confined strictly to filling small orders for present wants. A cable dispatch, received since our last issue, reports the Birmingham market for Coil Chain and heavy goods decidedly firm in its tone, and holders here are, in consequence, strengthened in their views.

Hermann Boker & Co., under date of 17th instant, have issued the following circular:

As it is impossible to keep always a full stock of all sizes of foreign Screws on hand, we have made arrangements with the American Screw Company, of Providence, R. I., to supply us with such sizes of their make which we should not have on hand of Nettlefold & Chamberlain, or Empire Company's make. This will give us an opportunity to fill all orders complete.

Discount Foreign Screws	50 & 15
Discount American Screws	47½

The market for Nails is unchanged since our last writing, and the ruling rates are fairly maintained, notwithstanding a slight falling off in the demand. We quote 10d. in lots from 10 to 100 kegs at $4·50, net, but a shrewd buyer might shade this figure a trifle for a lot of 100 kegs and over; the card rate, viz., $4·75, is scarcely worthy of mention, and is only quoted for orders under ten kegs.

Iron Wire is unchanged, with a considerable improvement in demand. C. Hammond & Son, of Philadelphia, quote their Unfinished Picks at $7, and Finished Picks at $8 per dozen, being a reduction on the former of $1·50, and on the latter of $2 per dozen; they also quote Pittsburgh Broad Axes at $20 per dozen. The Vulcan Manufacturing Co., No. 61 Warren street, quote, "Miles Challenge" Meat Cutters at the following list, less 20 per cent. discount to the trade:

No.	1.	2.	3.
Per doz.	$22·00	$30·00	$40·00.

Trade in House Furnishing goods, Tinners' Stock, etc., is quiet and without important feature. We quote: Copper Bottoms at 36c. net, in small lots. Brass Kettles are quoted at 55c. net, and 50c. net, in lots of 500 lb. and over. We quote Russia Sheet Iron, Nos. 8 to 16, 20c. per lb., and Stained, No. 1, 18½c. per lb., currency.

The following is the revised list established by the Brass Manufacturers at their recent meeting, mention of which was made in our last week's issue:

Brass.

ROLLED AND IN SHEETS.
(Brown & Sharp's Gauge.*)
For the purchase of 100 pounds and over at one time

HIGH BRASS.

All Nos. to No. 26, and widths 14 in. and under	38c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in. inclusive	39c
Over 20 in. to 30 in. inclusive	42c
⅛c ₩ ℔ advance on each No. above No. 28 to 38, inclusive.	
All Brass thinner than No. 38 is Platers' Brass at	55c
Sheets 24x48 in., and all sheets cut to particular sizes and lengths	42c
Printers' Rules	46c
Sheets wider than 30 in. and under 40 in	46c
" 40 in. and over	48c
Circular sheets, in diam. from 4 in. to 14 inclusive	46c
" " " over 14 in. to 20 "	49c
" " " 20 in. to 30 "	52c
" " " 30 in. to 40 "	55c
" " " 40 in.	58c

LOW BRASS.

4c ₩ ℔ [illegible] an High Brass.
Gilding [illegible]als, 7c ₩ ℔ more than High Brass.
Platers' or Gold Metal } In Bars 48c
Platers' or Gold Metal } Sawed 51c

FOR SLITTING: Metal in Width.
2 in. to ¼ in., to No. 30, inclusive. 1c ₩ ℔ advance.
2 in. to 1 in., thinner than No. 30, 2c ₩ ℔ advance.
2 in. to ½ in., " " 30, 3c " "
¼ in. and less to No. 30, 2c ₩ ℔ advance.
½ in. and less thinner than No. 30, 5c ₩ ℔ advance.
10 % discount.

SCRAP—NEW METAL.

High Brass Scrap, 18 cents, net.
Low " 20 " "
Gilding, 22 cents, net.
Turnings, Filings and Chips, half the price of Scrap net.

BRASS AND COPPER WIRE.
(Stub's Wire Gauge).

	High Brass.	Low Brass.	Gild'g and Cop'r.
Nos. 0 to 20	39	43	49
Nos. 21, 22, 23	40	44	50
Nos. 24 and 25	41	45	51

Brass Wire straightened and cut, 4 cents advance
10 % discount.

FINE WIRE—NET PRICES.

	High Brass.	Low Brass.	Gild'g and Cop'r.
No. 26	0·41	0·45	0·51
No. 27	0·44	0·48	0·54
No. 28	0·46	0·50	0·56
No. 29	0·48	0·52	0·58
No. 30	0·50	0·54	0·62
No. 31	0·52	0·56	0·66
No. 32	0·56	0·60	0·71
No. 33	0·60	0·64	0·81
No. 34	0·64	0·68	0·91
No. 35	0·69	0·73	1·08
No. 36	0·73	0·84	1·15
No. 37	0·88	0·88	1·28
No. 38	1·28	1·28	1·68

Ten cents per pound extra for Spooling.

TUBING.
(Brown & Sharpe's Gauge.)

	₩ ℔
Plain to No. 20, inclusive	$0·54
Nos. 21, 22, 23, 2c. advance on List for each No.	
Nos. 24, 25, 26, 4c. " " "	
Above No. 26 special rates.	
Plain Tube, 1-4 inch	70
" 3-16 "	1 55
" 1-8 "	1 80

All Mandrel-Drawn Tubes 5c. advance on List.
Fancy Tubing 4c. advance on List above Plain.
English, Scotch, and Extra Patterns Fancy Tubing to No. 20 63
Tubing sawed or cut 2 to 4 ft. long, 3c. advance on List.
Add to two cents a half-cent for each additional cutting under two feet. 10 % discount.
BRASS DOOR RAIL Polished—54 cents per lb.—10 %

BELT AND HOSE COPPER RIVETS AND BURS.

Price per ₩	49	50	52	54	56	58	60	64	68
Nos.	7	8	9	10	11	12	13	14	15

Braziers Rivets, 48 cents per pound discount 10 %.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire
4 per cent. 12 inch. to No. 26	0·75	0·90
6 " " "	0·85	1·00
10 " " "	1·05	1·25
15 " " "	1·30	1·55
18 " " "	1·45	1·75
20 " " "	1·55	

Discount 10 %.
German Silver Sheets over 12 inches wide and weighing more than 10 lbs. $2·10 ₩ ℔ net
Advance two cents for each additional inch in width above 12 inches, and two cents per pound on each No. thinner than Nos. 26 to 36, inclusive.
All German Silver thinner than No. 36 is Platers' at 50 cents per pound additional.
German Silver Scrap, one-third less than net price of 12 inch Market Metal; German Silver Turnings, Filings and Chips, half the price of Scrap.
* Brown & Sharp's Gauge is about two numbers finer than Stubs' Wire Gauge.

IRON.

American Pig.—The market for American Pig Iron continues very dull, and little improvement in the trade anticipated before the usual demand sets in for next year's supplies, which is general along in February. The stronger holders appear to be pretty steady in their views at about $35 for No. 1 Iron, but there are many furnaces very much pressed for money, who are offering their stocks decidedly lower, and if stocks of any brand were to be pressed on the market, it is doubtful if they would realize over $30, prompt cash. Small lots are selling at $33 @ $35. No. 2 Iron is in large stock, and obtainable at $28 @ $30. Gray Forge is also very plenty and quoted nominally at $24 @ $25. We understand that several hundred tons No. 2 extra Lehigh brands have been sold at $28·50, delivered here.

Scotch Pig.—The position of the Scotch Iron market remains about the same. The stocks here of all descriptions are very light, and holders do not appear to be anxious to realize. The demand is only of a jobbing character. Glengarnock has sold in small lots from yard at $38 @ $40. Eglinton is especially scarce, one party having about all there is here, and is holding it at $39. Coltness quoted at $43·50c. @ $45. Gartsherrie nominally about $48.

Bar.—The demand for Refined from store continues very slow, and only jobbing sales are reported.

Old Rails.—There has been very little, if any, trade in Old Rails, and prices are wholly nominal at about $35 @ $36 for Double Head and T.

New Rails.—Trade is at a standstill, and values, in absence of demand, are uncertain and wholly nominal at about $60, gold, for English and $65 @ $68, currency, for American.

Scrap.—The business in Scrap Iron is confined to such lots from ship and dock that owners do not care to store, and the prices realized are consequently very low. Sales include 250 tons, a mixed lot, from dock, on private terms; 110 tons Wrought at $30 @ $34; 244 tons Cast (sugar mill machinery) at about a cent a pound. The nominal quotation from yard is $35.

METALS.

Copper.—The market has been less active the past week, though the position is considered a strong one, and holders are only offering small lots. The steamers on Lake Superior and Lake Huron have suspended their regular trips, and the Sault St. Marie has been closed for the purpose of enlarging. This would indicate a stoppage of the supply until spring, and accounts for the sudden firmness of the market. The few sales that have taken place during the week have been at a further advance, the market at the close being quoted at 23c. @ 23¼c., cash. For future delivery little, if anything, has been done. Holders are asking 24c. @ 25c. Sales include 400,000 lbs. Lake at 23c. @ 23¼c., cash, and 100,000 lbs. Baltimore at 22c. @ 22½c., cash. Manufactured Copper remains quiet, though a sale is once in a while reported, but generally below the list. We quote at 36c. for New Sheathing, 38c. for Braziers, 45c. for Nails, 20c. @ 21c. for Old Sheathing, 25c. for New Yellow Metal Sheathing, 32c. for Bolts, and 27c. @ 30c. for Nails, Sheathing and Slating. Bolt Copper, 40c.

Tin.—The demand for Pig Tin continues very slow, and prices are still weak and tending downward. A sale has been made of 150 slabs Straits, at 27¼c., gold, 30 days, but holders generally ask 27½c., gold. English L. & F. is quoted at 26½c.; Refined, 27½c.; and Banca, 32c. @ 32½c., all gold. Tin Plates are quiet. Terne Plates are held at about cost of importation, though Charcoal and Coke Tin are said to be selling at a loss. We quote: Charcoal Tin, $9·50 @ $10; Coke Tin, $7·50 @ $8; Charcoal Terne, $9·50 @ $9·75; and Coke Terne, $6·75 @ $7·75, all gold.

Lead.—The demand continues light for Pig Lead, though holders of foreign are firm in their views at 7c., gold, for ordinary. Domestic Pig is quoted at 6c. @ 6 1-16c., gold. Manufactured Lead is steady at 9¼c. for Bar; Sheet and Pipe at 10½c., and Tin Lined Pipe at 16½c., less 10 per cent. discount to the trade.

Spelter and Zinc.—Only small jobbing sales are reported in foreign and domestic Spelter, and prices nominally remain about the same. We quote the former at 7¼c. @ 7⅝c., gold, according to brand, and the latter 7¼c. @ 8c., currency. Sheet Zinc is dull, and obtainable from dealers at 8⅝c. @ 8¾c., net, gold, which is lower than agents' figures, viz., 10c., less 4 per cent., gold.

Antimony.—The demand for Regulus is limited to small lots at about 13c., gold; large parcels obtainable at 12½c., gold.

PITTSBURGH.

PITTSBURGH, Nov. 15.—While there has been no actual improvement in general business this week, and notwithstanding there have been four additional bank suspensions, the feeling seems to be more hopeful, and many of our most far-seeing and observant business men seem to be strongly impressed with the belief that the worst is over. While the suspension of so many banks in such a brief period of time could not but have a depressing influence, as it created the impression, particularly among the laboring classes, that all the rest were in a shaky condition; yet the fact that they have all promised, provided a little time is granted, to pay their depositors in full, dollar for dollar, has done a good deal toward restoring confidence, which, for a few days, was badly shattered. Following are the names of these suspended institutions: Duquesne Savings Bank, East Liberty Deposit and Savings Bank, Mechanics' Savings Bank, Ira V. McVay & Co., and Mellon & Son. The creditors of McVay & Co. had a meeting yesterday, at which a proposition was made by the firm to pay off their entire indebtedness in two years, in four installments of 25 per cent. semi-annually, and it was accepted. The Duquesne Bank proposes to pay in five instalments of 20 per cent. Mellon & Son will no doubt be able to settle with their depositors in full in a few days, as the senior member of the firm, Judge Mellon, is one of our wealthiest citizens. Ninety per cent., it is said, is offered to depositors for their accounts in this bank, and refused. The East Liberty Bank is also regarded as perfectly sound, as is also the Mechanics', and the indications are that none of the creditors of any of these institutions will lose a dollar, although it will no doubt be a serious inconvenience for some of them to be deprived of their funds just now, when they are so badly needed. The national banks here are all in good condition, having pursued a very conservative policy ever since the panic set in, and while they would like to afford relief, they are determined not to resume discounting until every vestige of danger has disappeared; hence, money continues to work very close, and many of our manufacturers are badly in need, notwithstanding they have plenty of good paper, which ordinarily the banks are glad to pick up. If money would only ease up a little, business would soon revive, our large manufacturers would soon be working to their full capacity, as stocks are light both in first and second hands; but until it is, we cannot look for any improvement, as a business of this kind cannot be conducted without money; paper won't pay for labor and other necessary expenses, no matter if it is gilt edge. The Pig Iron trade remains substantially as noted in my last report, very dull and very much depressed; there have been some few sales during the week, but nothing of any importance—nothing to indicate prices. Consumers are buying only when forced to do so, and then in very small lots; they seem determined to carry just as little stock as they can possibly help; most of the mills are nearly out of Pig. Commission men say that there are no established rates, and in the present unsettled condition of the market they decline to give quotations. Choice Mill Irons are offering at $30, 4 months, and, possibly, a good buyer might obtain a round lot of, say, one thousand tons, at one, perhaps two dollars per ton less, 4 months, but this is only surmise. Your correspondent is cognizant of bids of $25, cash, having been made and refused. Producers seem to be strongly impressed with the belief that the bottom has been reached, and this, together with the fact that the production has been largely curtailed, as a large number of furnaces have blown out, has caused many of them to retire their product from the market. They are making no effort to sell, and, anyhow, they couldn't if they wanted to, unless they were prepared to offer inducements in the shape of very low prices. The market for Finished Irons, while it cannot by any means be called active, is all that can be expected. None of the mills have stopped, and some of them are still working double turn; and some firms report that their collections are improving. No change in prices. Quotations may be given on a basis of three cents for Bars, usual time. The Nail trade continues to fall off, and prices are weak and drooping; may be quoted at $4 to $4¼, with usual reduction for 100 keg lots and upward, and two per cent. discount for cash. There is a fair demand for Steel, but no change in rates. Manufactured Copper is dull, and while there has been no change made in the card, the tendency is downward, in sympathy with the raw material. Window Glass has undergone no quotable change. Large sizes are very scarce, and held firmly at very full rates; while the small sizes, for which there is but very little inquiry, are dull and in fair supply. None of the factories have started up as yet, but it is likely they soon will. The Coke trade is very much depressed, owing to the depression in the Iron trade, and some of the largest firms, it is said, have shut down; prices are lower and drooping. At a meeting of the Coal Exchange, the other day, it was resolved to reduce the price of mining to 3½ cents per bushel, to go into effect on the 24th inst. P. S., Nov. 17.—In writing about Finished Irons, your correspondent states it this letter that none of the mills had suspended entirely. Since writing that I learn that the Sligo mill's, owned by Messrs. Phillips, Nimick & Co. (formerly Lyon, Shorb & Co.), has shut down, and the reason assigned therefor is a want of orders. This is said to be the first time in the history of these works that they were stopped for want of orders. The mill of J. Painter & Sons has been running double turn this week, indicating an increased business. Zug & Co., of the Sable mill, report that they are still getting enough orders to keep busy, single turn. There was an easier feeling in money matters to-day, and the general outlook is brighter than it was last week.

The Pittsburgh *Commercial* of Nov. 15, says: There is nothing new to report in regard to the Pig Iron market. The market is extremely dull, quotations are merely nominal, and are about the same as quoted last week, but we can learn of no transactions of note. We have heard of some low cash and time offers for iron, but the figures being much below the producers' asking price, were refused.

PHILADELPHIA.

Messrs. LLOYD, SUPPLEE & WALTON, under date of Nov. 18, 1873, report as follows: We have no material change to report in trade since our last writing. During the last few days orders have come in a little more freely, and the few customers who daily visit the city appear more anxious to learn the general opinion of the larger houses in regard to the recent financial troubles than to buy goods. We find the manufacturers of Edge Tools, as well as manufacturers of Hardware, in and near our city, feel a little more encouraged, and in many cases where they had made arrangements to stop work some time during this month, they now feel like keeping their men employed some hours at least each day during the winter. Our city retail trade has not entirely stopped; all are buying in small lots, but the general trade is fair. Upon remittances we cannot see any improvement over the preceding week. The trade are satisfied, however, if all customers do something toward adding to the small bank balances they are compelled to carry. We reduce list upon Copper Rivets and Burs 8 cents per pound, with discount 10 per cent. The smaller trade are inclined to look upon this as an index for further declines. We notice, however, since the change has taken place an advance of 5 per cent. upon Copper. We also make discount upon Wrought Shutter Bolts 50 per cent. Nails have declined in our market 25 cents per keg. This has been anticipated, however, and if we may judge by the difference usual between the price of Bar Iron and Nails, we may reasonably look for a further decline of 25 cents per keg, at least. Other goods remain without any change.

Messrs. BLAKISTON & COX, Iron Merchants, 333 Walnut street, under date of Nov. 18, 1873, report as follows: *American Pig.*—The market continues dull; there is little or no demand, and few sales are making. The older and larger of the Lehigh furnace companies are firm in price, and are not disposed to offer their Iron at all, they contending that the worst is over, and the trouble that has lately assailed every branch of industry, is now a thing of the past. Collections are making better, and in consequence of the strict economical measures adopted by all, money is daily becoming more easy. The day when Iron could be bought at ruinous prices for cash, promptly paid, is past. Now that the fright which the recent monetary disturbances caused the producers of Pig Iron has passed, they are disposed to look more calmly at the times, and value their product more carefully than lately they have been doing. Sales of 100 tons No. 1 Foundry (Lehigh) at $35, of No. 2 Foundry at $32, of 150 tons Gray Forge at equal to $29, delivery here, have been made. *Scotch Pig* is being sold in a small way at $50 for Glengarnock, and at $46 for Eglinton.

LOUISVILLE.

Mr. GEO. H. HULL, under date of Nov. 17, writes us as follows: Market dull and lower; quotations on some grades must be regarded as merely nominal. Sales are confined to small lots for immediate use. A considerable concession is made on cash sales. The usual time, four months, is allowed on quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores	$45·00 @ 46·00
" 2 " " " "	38·00 @ 40·00
" 1 Forge, " " "	33·00 @ 34·00
" 1 F'dry, from Tennessee Ores	43·00 @ 44·00
" 2 " " "	37·00 @ 38·00
" 1 Forge, " " "	33·00 @ 34·00
" 1 F'dry, from Alabama Ores	45·00 @ 46·00
" 1 " " Iron Mountain Ores	46·00 @ 47·00

HOT BLAST STONE COAL.

No. 1 F'dry, from Missouri Ores	42·00 @ 43·00
" 2 " " "	35·00 @ 37·00
" 1 Forge, " " "	32·00 @ 33·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores	60·00 @ 62·00
" " Tennessee Ores	58·00 @ 60·00
" " Alabama Ores	60·00 @ 62·00
" " Georgia Ores	60·00 @ 62·00
" " Missouri Ores	58·00 @ 60·00
" " Kentucky	56·00 @ 62·00

CINCINNATI.

Messrs. ADDY, HULL & CO., under date of Nov. 17, write us as follows: There has been no improvement in demand during the past week. Sales are almost entirely confined to No. 1 Charcoal brands, in small lots. No transactions in low grades, and quotations are entirely nominal.

HOT BLAST CHARCOAL.

Hanging Rock No. 1 ₩ ton	$42·00 @ 45·00—4 mos.
" " No. 2	40·00 @ 41·00—4 mos.
" " Forge	30·00 @ 32·00—4 mos.
Tennessee No. 1	39·00 @ 41·00—4 mos.
" Forge	30·00 @ 32·00—4 mos.
Alabama No. 1	38·00 @ 40·00—4 mos.
Missouri No. 1	42·00 @ 43·00—4 mos.
" No. 2	40·00 @ 41·00—4 mos.

HOT BLAST STONE COAL.

Missouri No. 1 ₩ ton	$40·00 @ 41·00—4 mos.
" Forge	30·00 @ 32·00—4 mos.
Ohio No. 1	38·00 @ 40·00—4 mos.
" Forge	29·00 @ 31·00—4 mos.
Scotch Pig, No. 1	

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel ₩ ton	$60·00 @ 66·00—4 mos.
Missouri " "	59·00 @ 60·00—4 mos.
Kentucky " "	62·00 @ 65·00—4 mos.
Tennessee " "	58·00 @ 60·00—4 mos.
Georgia " "	60·00 @ 62·00—4 mos.
Alabama " "	60·00 @ 62·00—4 mos.
Machinery and Forge	55·00 @ 57·00—4 mos.
Blooms	105·00 @ 110·00—4 mos.

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, corner of South Charles and Lombard streets, report us the following prices under date of Nov. 18, 1873: Trade remains about as reported last week, and the business doing is prudently limited to the pressing wants of buyers. There is nothing new to note in prices.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ⅜ to 1 thick	3½c. to 3¾c. per lb.
1 to 4½ wide by 1½ to 2 thick	3¾c. to 3¾c. per lb.
Round and square, ordinary sizes, from ¾ to 2 inclusive	3¾c. to 3¾c. "
Hoop Iron, 1½ wide and upward	5 to 5¼c. per lb.
Band Iron, from 1¾ to 4 in. wide	4 to 4¼c. "
Horse Shoe Iron ¾ to 1 wide by ⅜ to ½ thick	5 to 5½c. "
Norway Nail Rods	7⅞ to 8 c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	16½c. "
Machinery Steel	11½c. "
Cast Spring Steel	11c. "
Homogeneous Steel Plate	13c. "
Perkins' Horse Shoes, per keg of 100 lbs	$6·37½
" Mule Shoes " "	7·37½

Common Horse Nails, from 14c. to 18c per pound.

10	9	8	7	6

Putnam Horse Nails..23 24 25 26 28c. per lb.
R. R. Spikes.....5½ by 9-16 at 3¼c. to 4c per lb.

FOREIGN.

GREAT BRITAIN.

Messrs. J. Berger Spence & Co., London, Glasgow and Manchester, under date of Nov. 1, 1873, report:

Metals.—This market has been quiet during the week, and business transactions are now becoming more than ever strictly confined to the immediate wants of consumers, which at present are scarcely sufficient to keep smelters and manufacturers fully employed. A further decline has taken place in the value of Scotch Pig Iron Warrants, and makers' Iron is easier. The shipments for the past week amounted to 11,435 tons, against 13,916 tons in the corresponding week of 1872. Middlesborough Pig Iron, being comparatively much cheaper than Scotch, has not felt the pressure sufficient to compel producers to reduce quotations, but the orders coming in are not up to the average. In Manufactured Iron complaints are rife of the scarcity of specifications, and but few of the works are working up to their full power of production. Copper, which a little time ago was showing a considerable amount of liveliness, has suffered a relapse, which has been increased by the late advices from the West Coast. The charters from there for the last fourteen days of September are cabled as 3000 tons, consisting of 1500 tons fine Copper, and 700 tons Ore and Regulus for the United Kingdom, and 800 tons fine Copper for France. The stock on the Coast is returned as 4800 tons. Some underselling has been going on in Tin, but the lot was soon cleared off and values are again firmer. There is no alteration in Lead, but the tendency is upward. Spelter is without change. By auction this week in London, 105 tons Sheet Zinc sold at £30. 12/6 per ton.

IRON—"Ayresome" Yorkshire Pig Iron, No. 1, 105/; No. 2, 100/; No. 3, 97/6; No. 4 (Foundry), 95; No. 4 (Forge), 95/ net cash, or 2/ extra 4 months' bills. Scotch Pig warrants, 109/ to 110/. Staffordshire Bars, £12. 10/ to £14. Hoop Iron, £13. 10/ to £14. Gas Tubes, 50 per cent. off new list. Boiler Tubes, 32½ per cent discount.

COPPER.—English Tough Ingot, nominal, £92 to £94. Chili Bars, £83. 10/ to £85.

TIN—English Ingot, nominal, £126 to £128. Straits, £120 to £122.

TIN PLATES.—Best Coke, I. C., 30/ to 34/; Charcoal, I. C., 34/ to 38/ per box.

LEAD.—Best English Soft Pig, £24 to £24. 10/. Refined Red Lead, £26 to £27.

ANTIMONY.—French Star, £58 to £59.

SPELTER.—Silesian, Special Brands, £27 to £28. English, best Brands, £27. 10/ to £28.

FRANCE.

(*Moniteur des Interets Materiels.*)

PARIS, Nov. 2, 1873.—*Metals.*—It is hardly necessary that we should insist that the present state of monetary affairs exercises a most damaging influence upon the metal markets. With an excessively high rate of discount, and prospects before us by no means reassuring, speculation is crippled and discouraged, and consumption does not step beyond immediate and urgent requirements. But however moderate the demand may be, prices are, on the whole, toler-

ably well upheld. Producers would be quite willing to make liberal concessions in order to hold out real inducements to consumers, but their hands are tied by high wages and exorbitant Coal prices, which would prevent them from replacing as cheaply to-morrow what they sold to-day. We fear much that these drawbacks will stand unremoved for some time to come. Both the Coal companies and operatives continue to insist upon maintaining exorbitant rates, and in thus declining to listen to reason they prevent metallurgical industry from reviving, and in the long run their interests will suffer a great deal more. *Copper.*—London has been quiet and rather heavy. Paris has been dull, with very little doing. Havre, flat and nominal; quiet and unaltered at Marseilles. In Germany but a limited trade is doing, for consumption only. Prices weak. Berlin is at 30¼ to 31¼ thalers. Tin has been keeping comparatively steady at first, but subsequently again became heavy in the leading markets. London has been weakening toward the close. Paris has been rather firm, but the dealings have been light. Banca, here and at Havre, 325. Marseilles declined considerably, and then recovered; Banca, 335. Little doing in Holland, and with a downward tendency. German quiet, but sustained; Banca, at Berlin, 43 to 43¼; tendency weak at the close. Lead has been firm, with a good deal doing; Paris firm at 60 francs for French. Marseilles well sustained, with sales for consumption at 60 francs. Holland is rising, and Spanish commands 14¼ guilders. All the German markets are stiff. Berlin at 8 to 8⅝. At St. Petersburgh the metal sells at 31½ roubles the 164 kilos. About Spelter little can be said, although larger transactions can be reported. London is steady. Paris is looking up at 71¼, Silesian, deliverable at Havre. Marseilles unaltered. Germany has not been over brisk, but firm. Berlin, W. H. Brand, 9¼, Silesian 8¾. Breslau without dealings of note. *Iron.*—The demand is steady enough to enable us to dispense with the usual list of works that have extinguished their fires we have had to give of late, week after week. The retail trade and the railroads of the country are compelled to enter the market whenever they have urgent wants to be attended to, and care little about the financial or political outlook. This is the case at present; hence, a certain degree of animation and increased firmness both in Pig and Wrought Iron. Our great rail works are actively engaged in filling the orders of a good many companies. In Paris there is no change; business revives but slowly, being kept in check by political apprehensions. *Coal.*—There is a gradual accumulation of stock, and the tendency seems to be most decidedly toward a lower range. At the North most of the consumers have bought sufficient to last them for the winter months, but few purchasing "futures" beyond the month of February. Some collieries are ready to sell "futures" for 1874 between 2 and 3 francs below current rates. At Paris the demand for domestic purposes has subsided, and at La Chapelle and Anbervilliers large quantities are now being disposed of considerably below our last week's quotations.

BELGIUM.

(Moniteur des Interets Materials.)

BRUSSELS, Nov. 2, 1873.—*Iron*—The recovery in the English market has as yet had no perceptible effect upon our own. Pig and Wrought Iron are, it is true, arrested in their downward course; they could hardly have gone any lower. A revival worth speaking of we have not to record. There is little doing in Pig Iron. The furnaces that have remained at work see the supply augmenting upon their hands despite the extinguishing of so many competitors' fires around them. The present range is 100 to 150 for the different sorts. Wrought Iron is no better off, even after declining all the way to 260 francs, for even at this there are no buyers. Some establishments sold as low as 250, but the concession made has not brought them a steady run of business. Rails are in better request, without being brisk. A revival in the article is looked forward to, and we think not without good reason. Although Sheet Iron has been moving off tolerably well, there has been no improvement. There is not much doing for export either. From Germany there are hardly any orders, and from France none whatever, Iron there being as low as it is here. No general briskening up of business can be expected till we have a break in Coal. The accounts from Liege are far from satisfactory. With the exception of a few large works, the remaining ones all complain. *Coal*—The taking in of Coal for the winter is drawing to a close, and with it are vanishing the sanguine expectations of a great rise that had been entertained by many. Large lots are no more bought for the purpose. Producers now attribute the sudden slackening to warmer weather, but, in the meantime, the stocks that had run low are replenishing, and concessions are being offered in order to attract customers. At the bottom there is little faith in a maintenance of high Coal prices. The Coal fever is evidently in its last stages, and people begin to open their eyes to the fact that in the long run no prosperity is possible, like the one of European coal producers, which is based upon the crippling of all other branches of industry. English and German Coal is pouring into the country, and the quality of Belgian Coal but ill compares with the foreign fuel. Charleroi and Mons are, nevertheless, firm at previous rates. In the spring a general decline in Coal in Belgium seems unavoidable, although we are not over confident as to its magnitude. Coal would be lower now already, but for a considerable decrease of production that has taken place. Extensive repairs are going on in some Coal districts.

GERMANY.

(Borsenhalle.)

HAMBURG, Oct. 24, 1873.—*Metals* are quiet, on the whole. *Lead* is well sustained, although the dealings are restricted. German, 25 to 26; and English, 26 to 26·6 marks. *Copper* is quiet, but firm. Northern sorts, at 96 to 105; Minnesota, 126. *Tin* is weak. Banca, at 1·40; English, at 1·37 to 1·38; Rods, 1·40 to 1·42½. *Spelter*, without anything doing, at 27 marks.

Oct. 31.—*Lead* is held higher. German, at 25½ to 26; and English, at 26¼ to 27⅛ marks. *Copper* does not stir. Northern sorts are 96 to 105; Minnesota, 126. Nothing is doing in *Tin*, and the generally entertained opinion, as well as tendency, unfavorable and weak. Banca, 1·40; English, 1·37; and Rods, 1·40. Absolutely nothing transpires in *Spelter*; nominal quotation, 27.

HOLLAND.

(Nederlandsche Courant.)

AMSTERDAM, Nov. 1, 1873.—Banca Tin is firmer and held at 73 to 73¼ guilders. The October Banca and Billiton Tin deliveries have been quite considerable. Billiton, on the whole, ranges too high to lead to much business.

AUSTRIA.

(Freie Presse.)

VIENNA, Nov. 3, 1873.—The Iron industry seems to be seriously threatened by the critical condition of financial affairs in our midst, and, as is usually the case in this country, the government is immediately appealed to through deputations and petitions to come to the rescue and assist the endangered interests. Although the Minister of Commerce assured the gentlemen who had been delegated to wait upon him that the government had the firm intention of helping Austrian industry, he remarked that the desire expressed by them to enjoin upon Austrian railroad companies to purchase their supplies exclusively in Austrian workshops could not be complied with, and that a decisive refusal was the only answer he had to give them. The fact is that foreign countries can supply us a great deal cheaper than domestic workshops. Thus a purchase has been made for the Austrian State railroad at the Schneider establishment at Creuzot of 161,000 cwts. Rails for the Bohemian branches. Although the Bohemian shops are bare of commands, and keep but 25 per cent. of their operatives at work to save them from starving, and although the manufacture of these Rails would have kept these establishments busy during from four to five months, the supply is drawn from abroad because of its greater cheapness.

EAST INDIES.

(Behn, Meyer & Co.)

SINGAPORE, Sept. 20, 1873.—*Malacca Tin.*—There has been a fair demand for shipment to the United States and China, and the market has been cleared at $34·20 to $34·25 per picul; supplies are moderate. There is no demand for Tin for Europe. For New York the Invincible has been chartered for a miscellaneous cargo; Tin at £2. 15/, to load here and at Penang, and the Marshal Pelissier at £2; and for Boston the Johanna Willem, at £2000 in full, for 442 tons. *Exchange*—6 months London is firmer at 4/3¼ to 4/4⅛.

(Aitken, Spence & Co.)

COLOMBO (Ceylon), Oct. 4, 1873.—*Plumbago*—The exports of the commercial year just over have been larger than any previous one, amounting to 8431 tons, against 6995 last year. Of this, 5037 went to America direct, against 3727 tons during 1871-'72, showing an increased export to the United States of 1310 tons, more than the entire direct shipments of 1870-'71, which were only 999 tons. Our market for this article is now very dull, and there is almost a total cessation of new business in it, especially during the last week, when advices by wire came to hand announcing a considerable fall in the London market. Stocks, however, on the spot are very trifling, as the mines are almost entirely worked by natives, with orders and advances in hand for some time before delivery to purchasers. It will be seen from the following quotations that they are reduced: Lump, cleared, including packages, per ton, free on board, with commission, exchange at par, 451/6; freight to New York, 75/; Chip, 220/6; and Dust, 115/6. *Exchange*—6 months London, 1/11¼ to 1/11 5-16.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending November 18, 1873:

Hardware.

Albertus G. W.
Cases, 3
Casks, 1
Bush R. T. & Co.
Galv., wire, lots, 39
Beam & Murray,
Casks, 4
Anvils, 200
Cases, 2
Boker Hermann & Co.
Cutlery, pkgs., 3
Mdse. pkgs., 21
Arms, cs., 12
Casks, 2
Boiken, Yarrigues & Co.
Cases, 2
Brooks E. A.
Cases, 1
Campbell H. P.
Packages, 5
Carpenter C. C.
Wire, bdls., 91
Cockayne J. W.
Cutlery, cks., 1
Connolly M.
Cases, 1
Packages, 1
Cyron E. R.
Arms, cs., 6
Dickinson Henry
Casks, 2
Drexel, Morgan & Co.
Files, cks., 2
Fuller Bros.
Casks, 2
Frasse P. A. & Co.
Mdse. pkgs., 5
Field A. & Co.
Chains, cks., 5
Packages, 51
Fleisch A. & D.
Cases, 2
Hilger E. & Sons,
Packages, 8
Harris S. E.
Cases, 9
Harmar Wm. & Co.
Mdse. pkgs., 4
Harmar, Hayes & Co.
Mdse. pkgs., 1
Hamnacher A. & Co.
Mdse. pkgs., 7
Hildick A. H.
Chains, cks., 7; pcs., 2
Justice P. S.
Wire rope, coils, 3
Jackson W. H. & Co.
Cases, 6
Jackson R. D.
Casks, 1
Cases, 1
Laughland & Co.
Wire, cks., 11; pkgs., 33
Lewis & Conger,
Cases, 2
Lau & Garlichs,
Mdse. pkgs., 2
Many F. L. & Marshall,
Casks, 2
Merwin, Hulbert & Co.
Guns, cs., 3
Merchants Dispatch Co.
Cases, 7
Chains, 5
Mason John W. & Co.
Wire rope, coils, 18
Milliken S. Jr. & Co.
Wire rods, bdls., 736
Roosevelt S. & Co.
Chains, cks., 10
Rosenthal J. & Co.
Packages, 4
Spies, Kissam & Co.
Mdse. pkgs., 2
Sawyer John.
Wire rope, coils, 3
Schoverling & Daly,
Mdse. pkgs., 4
Tomes, Melvain & Co.
Cases, 1
Per. caps, cs., 3
Turnor R. A.
Casks, 1
Mdse. pkgs., 4
Chains, cks., 17
Anvils, 40
Tyng & Co.
Cases, 1
Van Nest A. R. & Co.
Cases, 1
Van Wart & McCoy,
Hoes, cks., 5
Casks, 2
Case-, 3
Packages, 3
Wilson D. C. & Co.
Cases, 2
Wiebusch F.
Chains, 10; cks., 57
Anvils, 100
Packages, 8
Order.
Casks, 6
Files, cks., 8
Anvils, 1
Cases, 7
Wire, bdls., 74

Iron.

Armstrong L. & W.
Scrap, tons, 244
Bruce & Cook,
Sheet, bdls., 837
Coiled rod, bdls., 85
Crocker Bros.
Pig, tons, 30
Congreve Chas. & Son,
Rails, 1176
Dwight & Platt,
Scrap, tons, 150
Drexel, Morgan & Co.
Fish plates, bdls, 2403
Laughland & Co.
Haybands, bdls., 2015
Lawton & Lenox,
Bale ties, lots, 517
Leigh R. & Co.
Scrap, bags, 150
Morton, Bliss & Co.
Rails, 1003
Naylor & Co.
Fish plates, bdls, 658
Rails, 2358
Prosser Thos. & Son,
Tubes, bdls., 17
Piersons & Co.
Rods, bdls., 266
Whitney A. R. & Bro.
Bars, bdls., 424
Order.
Hoop, bdls., 205
Bundles, 175
Bars, 597
Sheet, bdls., 1525; cs. 46
Rails, 1545

Steel.

Brown Wm.
Bundles, 361
Cases, 15
Cockayne J. W.
Cases, 7
Bundles, 8
Bars, 16
Drexel, Morgan & Co.
Rails, 3202
Plates, 752
Hogan John.
Bundles, 47
Packages, 15
Cases, 37
Bars, 5
Naylor & Co.
Plow plates, 120
Bessemer fish plates, bdls., 380
Cases, 93
Tires, 16
Rails, 96
Bundles, 30
Bars, 36
Piersons & C.
Bundles, 266
Order.
Bundles, 1541
Casks, 2
Rod, bdls., 51
Bars, 34
Tire blooms, 93
Tires, 6

Metals.

Bruce & Cook,
Tin plates, bxs., 1370
Barthold R. R.
Scrap, copper, cks, 12
Byrne Joseph,
Tin plates, 500
Baring Bros. & Co.
Lead, pigs, 1000
Brown Bros. & Co.
Plumbago, bbls., 789
Caruana C.
Scrap, copper, cks., 5
Dickerson J. S. & Co.
Tin plates, bxs., 550
Goodwin, Rice & Irwin,
Tin plates, bxs., 67
Hart L. & Co.
Tin, slabs, 150
Jackson R. D.
Bar tin, bbls., 10
Kaufmann S.
Lead, pcs., 826
Mason John W. & Co.
Zinc, cks., 5
Naylor & Co.
Tin plates, bxs. 530
Phelps, Dodge & Co.
Tin plates, bxs., 6549
Rulon J. W. & Co.,
Plumbago, bbls., 150
Seymour W. N. & Co.
Casks, 2
Wessels, Geo.
Yellow metal, lbs., 18
Waydell & Co.
Scrap, cooper, hhds., 5; bxs., 12
Order.
Tin plates, bxs., 3764
Lead, pcs., 741
Plumbago, bbls., 12

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, Eng., November 7, 1873.

The Bank rate has gone up to 8 per cent., and if we may accept the outward and visible signs of what is probably to follow, troublous times are in store for certain members of our commercial world. To the larger portion of the speculative many who hover about the skirts of Mammon and make commercial bricks with amazingly little straw, anything over five per cent. is certain confusion, and the increase of that rate to six, seven, or eight per cent. deals destruction to them, and their best laid schemes "gang aglee" with a rapidity that is only clearly shown in the Courts of Bankruptcy. I have not herein to object to the Bank Charter Act—that has already been done, both in these columns and by other and higher authorities—which regulates this hard and fast line of monetary transactions, but I am bound to state that the information we are just at present receiving from the United States is not by any means calculated to restore confidence or to have any tendency in the direction of bringing down discounts. We are receiving telegrams containing latest excerpts from your press giving dismal intelligence as to the state of trade throughout the States, and particularly in the iron industries. Ironworks are being closed, say these reports, hands are being dismissed, and proprietors who have been "interviewed" give gloomy prospects of the immediate future of the trade. Further than this, a London correspondent, who is usually very well informed, says that he has observed, to his astonishment, in American financial circles there within the past few days a feeling of profound depression and anxiety, owing, he says, as they state, to the great probability of a much graver financial convulsion than has ever yet been seen in that country. He proceeds to say that "for many years everything bought and sold in the United States has been disposed of or acquired at a fictitious value. It was paid for in paper money that had only a nominal value, and everything was kept up by an artificial and unwholesome excitement. The hot fit is now over, the cold fit has followed; the temporary check of the New York panic was only a superficial and deceptive sign of improvement—the patient is certain to be much worse before he is better; and in short, a general crash is coming, and coming fast. Some startling facts were told to me, for example, concerning real estate. For a long time the nominal values of lands and houses has been increasing until even the most exorbitant rents failed to return a profit to the owner; but to-day there is a panic even in real estate, and landed property of every description can only be sold at rates which are absolutely ruinous to the owner." Now, allowing something for the effects of imagination in this, it is, I think, unquestionable that statements such as these, combined with the dearness of money here, are likely to cause an uneasy feeling in the minds of those who have large mercantile transactions with America. Personally, I am very well aware that a considerable amount of uneasiness prevails in the steel trade here. Many of the larger firms have somewhat heavy running accounts with some of your merchants and manufacturing or jobbing concerns, and although these have naturally been kept down as low as possible, there is always a sufficient amount of risk to make the subject a matter of uneasiness, if not in all cases of anxiety. As I have already informed you, in a former letter, the steel manufacturers here are only running their works three days per week, partly owing to the slackness of business, but mainly with the object of bringing down the price of coke. This has even now had some effect. A few days after the announcement was made that the steel firms had entered into this combination—information as to which was, I may remark, first given to you in my letter—the Durham, Yorkshire and Derbyshire Coke Association reduced their quotations by 5/ per ton, or from 40/ to 35/ at the ovens, 50/ to 45/, respectively, delivered at Sheffield. Now, 5/ per ton reduction in soft coke is a boon, but it is not large enough, and, further, *it comes almost too late.* Six months ago the concession might have saved the trade, but now nothing under 10/ or 15/ fall will stimulate business. Local makers of hard washed coke for steel smelting have put prices down 7/ per ton, but the same remark applies to them. Mr. W. C. Wardlow, a member of the firm of Wardlow Bros.—who are, I know, well known in the States—writes to a local paper on this subject, and as his remarks are intelligent and to the point, I have some pleasure in quoting a portion of them. * * * "That the high price of fuel is the cause of this depression we most emphatically assert, and this we have repeatedly urged in our appeals to them (the coke masters) as an imperative reason why they should make an early and substantial reduction in their prices. We would fain have wished that they had listened to those appeals before so much of that trade had been diverted into other channels, but even now we fully appreciate the measure of response they have given to the pressing necessities of the time. We, however, respectfully urge upon them the wisdom of making that reduction of a more material character, so as to enable the steel manufacturers to make a general reduction of £2 per ton in the price of steel, which would be done with coke at 30/ per ton. The interests of trade in all departments where steel forms such an important item of cost, the maintenance of our own in foreign markets, indicate the necessity that this reduction should take place, and our large and important trade, with America especially, would thereby receive an impetus that, if I mistake not, would speedily be felt in the interests of both steel and coke manufacturers." This almost appears an appeal *ad misericordiam* at first sight, but I think the facts of the case quite justify what the writer says. One would have thought that coal and coke would fall and rise in unison, but such is not the fact—house coal having gone up 1/ to 1/6 per ton at the same time that coke dropped. Taking into consideration what has been alluded to above, and the failing state of trade generally, I think we shall not be far wrong if we conclude that a dull winter lies before us, and that a tightness of the money market and slackness of trade will be found coexistent.

In view of the influence trades unions have had, more or less directly, in bringing about this state of things, I am induced to quote a few remarks made by Mr. Brogden, M. P., at Darlaston the other night, in speaking to a gathering of nut and bolt makers. He advised the men and their wives to make hay while the sun shone, for there were signs that no prudent person should lose sight of or neglect. "From America the news came that 1000 manufactories had been stopped, and a great many more had been put upon half time. In the great industry which prevailed particularly in Staffordshire, the greatest distress prevailed in America. The iron trade there was suffering, and he would state that he had the other day 10,000 tons of rails lying at New York offered to him at £2 a ton less than they could be bought for and put free on board in Wales. This showed that America—one of our largest customers—was not in a condition at present to continue that demand, and that we should lose for the time being a very good customer, and all the trade that has come from America. In Germany there were signs of a similar character, where collapse had been followed by distress, and it had become necessary—for himself as well as for those he was addressing—to put their houses in order, for they did not know how soon similar trouble might come upon them."

This, coming from one in the trade of Mr. Brogden's status, is worth perusal, and is a sign of the times. Whether the offer he mentions could be made good in reality, or whether your trade would, as a whole, wish to imitate the example so set, is a question I cannot discuss, believing that you possess far better means of judging its value than myself, or, indeed, any one on this side the Atlantic. In the Birmingham papers several manufacturers have been carrying on a paper war on the subject of the galvanized iron trade. One "Manufacturer" actually states that he is selling his production at £3. 10/ per ton under legitimate prices—anent which another remarks that "it is well for him and his creditors that he signs anonymously." A third, signing the initial "J," reviews the previous correspondence, and stoutly concludes thus:

"I would say to 'Manufacturer,' if he really is one, 'Examine the constituents of a ton of galvanized iron. Calculate your loss in pickling the spelter taken up at 3d. per pound, the quantity of ammonia used per ton, labor, cokes, slack, coal, acid per ton, and say if you can, with justice to yourself, your capital and your creditors, make iron at the price you name (£19 to £21 per ton). Not one of your correspondents say they have made any stand against these low prices, content to think there is no limit to the profits on galvanizing. This theory is exploded, and it will be well for these new beginners to reserve to themselves a legitimate profit on the heavy capital invested, and get their trade by sending out a good article; they will then, in time, be able to get a remunerative price. I would not work at a loss for anyone. If prices do not yield a legitimate profit, in consequence of a depressed state of trade, I would say, do less and wait patiently."

As a matter of strict fact, it is the disregard of this axiom—the willingness to sustain present positive loss in order to "hold the connection together" in time of bad trade—which has been one cause of Great Britain's manufacturing supremacy, and has enabled her to uphold her wares in distant markets against all comers hitherto. Whether such will be the case in the future no one can at present safely predict. In a strictly business sense it is bad—nay, suicidal, policy, and it is possible that more thorough acquaintance with the exact principles of political economy will cause it to be entirely abandoned. Prices will become more equalized, enormous profits will no longer accompany good trade, and each transaction must be made to stand by itself for profit or for loss. Competition at home, competition here, there and everywhere, will make this a *sine qua non*, and we shall no longer witness monetary sacrifices in dull times, made as a speculative investment in view of the "good times that are coming." On every side strong and eager competitors are springing up, and although the British giant will hardly be vanquished, he will feel henceforth that there are thorns in his side, and that the path of the commerce of the future is by no means the "way of pleasantness," albeit it may not of necessity be a *via dolorosa*. Whoever beats England must be a David, for the old country is a Goliath—a natural giant, who lacks nothing either in experience, strength or prudence. As to the current prices and the transactions of the day, I am obliged to confess that they are not worth recording. Glasgow warrants are in the main going down still, and the other day reached 109, but are now 112. Makers' quotations are correspondingly a few shillings lower. Middlesboro' No. 3 pig is easier, and is quoted at £4. 17/6 to £5, nominally. At Sheffield—beyond what I have named—and at Birmingham there is no change, save that at the latter town good orders from Australia and New Zealand for hardware continue to be received. The iron trade of South Staffordshire is quite unchanged, the demand being limited and prices unaltered. South Wales furnishes no item of note. Cyrfarthfa is sending rails to Riga and New Orleans, and Dowlais to the latter place, also.

Railways and Telegraphs in China.

Eight years ago, Mr. E. A Reynolds, an English resident in Shanghai, strove for the honor of being the first to lay a telegraph in China. He knew it was no use asking permission—Chinese officials always say "No" to a novelty—so he determined to try what he could do by a *coup-de-main*. The line he selected was from Shanghai to a place called Kintoan, about thirty miles down the Yang-tse. He prepared his posts and when everything was ready he erected them as rapidly as possible. The people did not interfere; but it is likely the officials stirred them up, for within a few days the Taoti declared he had received petitions from all the country side protesting against the innovation, and declaring that a man had already been killed by the evil influence created. The posts were pulled down by the country people; some remonstrance was made, but the matter soon dropped.

Another attempt was made four years later to obtain permission for the erection of this line, which would be of great value to shipping, as the channel is difficult near the Kintoan terminus, and assistance could be telegraphed for to Shanghai in case of accident; but in vain. The old argument of Fungshui was advanced, and the matter was again dropped. Within the last twelve-month, certain foreign residents in Shanghai have brought up a tract of land sufficient for the construction of a wide road to Woosung, the point at which the River Hwonghoo, in which Shanghai is situated, joins the Yang-tse. The owners call themselves the Woosung Trading Company at present, but it is quite likely that rails may be laid for their trucks to run on as the enterprise matures. Within the last two months the Great Northern Telegraph Company, who have already a cable laid down the river to connect with their sea cable to Hong Kong, have acquired from the tramway company permission to erect a line of telegraph along their land to Woosung. No one objected; the country people were employed at good wages in the work; the elders of the villages were interested, by good fees, in caring for its progress and maintenance, and occasional old women were given presents to silence their dislike to the innovation. The telegraph is now finished and working. This being so, and some days having passed, the *North China Herald* ventured to chronicle the incident, and contrast it with the previous failures. At once the Taotai came to visit the British Consul; he had known of it, winked at it, but would be obliged now to make official objection to the undertaking. Here is a clear instance where the people are well pleased to have a line of telegraph running twelve miles through their fields, and where an intelligent Taotai, who has winked at its construction, is terrified at the prospect of such innovation coming to the ears of his superiors. He said, however, that he dared no longer remain quiet, and he has accordingly written to the foreign Consuls, declaring the telegraph to be illegal, and requiring that the posts be immediately removed.

A Plea for the Truth.—The Philadelphia *Ledger* talks as follows to the corporations and financial institutions which are promoting public distrust by concealment: "We do not say, or even intimate, that those in the control of our great companies, railroads, banks, saving funds and the like, say what is not true when interrogated in reference to the financial situation of their respective companies, but we do say that in all the time that the present crisis has interfered with and unsettled business, the most contradictory reports have been made, and that in our own experience we have found not only marked reticence on questions that public institutions ought to afford to the public truthful information, but the truth is often withheld, and in some instances a perversion of facts are allowed to go out which work to the prejudice to the parties withholding it. Inferences have been substituted for facts infinitely more prejudicial than the truths. In this connection a New York contemporary justly says, financiers and capitalists, merchants and manufacturers, may indulge in as much dalliance with the possibilities of the hour as they please, but it should not be forgotten that there are other thousands representing small morsels of wealth who are interested in honest statements. The country desires to know something of the strength of the banks and the situation of other great operations, but the information is practically denied. We all want statements of the fiduciary capacity of our city and States, but there seems to be a timidity in making it public. In other words, the sore is not in a presentable condition. It is this secrecy, this close corporation business, this unwillingness to face unflinchingly, like honest men, the broad facts of the hour, that has caused so much of public doubt, and not until we have a fair and honest exhibit of the condition of our banking institutions and other corporations can we expect anything like a return of public confidence. These are all solemn truths, and the sooner bank and railway managers come to the conclusion that open, frank statements invite more of public confidence than they expose to the prejudice of private interests, the better for all concerned, and especially better for the companies. This hint is worth heeding."

Kanawha Coal.—The following report of some of the information given at a meeting recently held in Charleston, West Va., of persons interested in the development of the resources of the country along the Kanawha River, is given by the *West Virginia Journal:* "The committee from the United States Senate, composed of Messrs. Conkling, of New York; Sherman, of Ohio; Davis, of W. Virginia; Norwood, of Georgia; and Windom, of Minnesota, and others interested in the Virginia water line, requested such persons as had made the mineral resources of this country a matter of study and practical investigation to assist them (the committee) in obtaining the necessary information. They were fortunate in having Professor Ansted, of England, whose authority on these subjects is acknowledged everywhere, to give them information, which he did in answer to pointed and practical questions. W. H. Edwards, Dr. J. P. Hale, M. F. Maury, and others, appeared also before the committee, and furnished much valuable data relative to the coal, salt, iron, and other minerals on along the proposed water line from the Ohio River to the Chesapeake Bay. Professor Ansted stated that the Great Kanawha coal field was the most remarkable in the world for the variety, richness, and extent of its coal deposits; that at Hawk's Nest, in Fayette county, about forty-five miles east from Charleston, he had this month made an examination and found fourteen workable veins of coal in the same mountain, lying horizontally, and all above the bed of New River. He further stated that the iron deposits east of the Alleghanies, and on the head waters of James River, were as extensive as the coal on New River and the Great Kanawha, and that iron could be manufactured along the Chesapeake and Ohio Railroad at half the cost that it could now be in England. He further stated that water transportation is necessary to utilize fully these vast coal and iron deposits. Hence the importance of slack-water navigation on our river. The report of the Senate Committee, when printed, will contain much useful information on these subjects."

The Danville Mine, in Warren county, N. J., owned by the Crane Iron Company, is a very productive property. For the three months ending with September 5700 tons of ore were taken from it and shipped to the furnaces at this place, to wit: July, 2200 tons; in the month of August, 1737, and in the month of September 1759 tons. For the month of October the company ordered from 1400 to 1600 tons to be shipped, curtailing the amount a little on account of the depression in money matters.

Tin or block plates are now being manufactured in England by a new process, consisting in the preparation of the iron used in their manufacture. A number of refining furnaces are employed, into the first of which the pig or cast iron is submitted to the melting process, and from thence run into other "lumping" refineries. Instead of using charcoal, as is commonly the case, the fires are fed with tan. This process has proved very satisfactory, and is meeting with popular favor by those engaged in this branch of industry.

An exchange says there is a railroad in Illinois called the Gilman, Clinton and Springfield, which beautifully illustrates the railroad building spirit of the age. The construction ring let out the grading at thirty-five cents a cubic yard, and it was sub-let through several hands down to twelve cents a yard. The farmers boarded the hands and got cheated out of their pay. This indicates talent equal to another Pacific Railroad.

The iron mines at Bilboa, in Spain, have fallen into the hands of Don Carlos, who will not permit them to be worked, in order that the miners may be forced to join his army. The export of ore from these mines to Great Britain has increased from 85,000 tons in 1868 to 631,000 in 1872, and the British iron trade will suffer if no further supply can be had. Two Sheffield firms alone had even arranged to import 1,000,000 tons annually.

The following concise and comprehensive note was received by a Shenandoah hardware man, from an up country farmer the other day: "Send me a trace chain and a keg of nails. Sally had a baby last night—also two door locks with white knobs."

PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, Nov. 17, 1873.

The troubles of the panic have been almost forgotten during the week by the excitement over the Virginius affair. A speck of war always inflames the minds of our excitable people, and we are ready to drop business for the musket on the slightest provocation. Whether war should result from the terrible outrages against humanity perpetrated by the *Gachupinos* of Cuba or not, the activity at our navy yards in fitting out vessels will furnish employment for many men now out of work. The lamentable admission by the President that our navy is in no condition for a war is, however, a matter for the notice of Congress, since the number and available force of our private shipyards renders no excuse for such a state of things possible, even were the navy yards unable to preserve our small number of vessels in a fitting condition for war. There is, however, somewhat of improvement noticeable in trade circles, and dealers report more activity and manufacturers some orders as coming in; indeed, Pittsburgh advices state that had not the revival of the money troubles there occurred, which was occasioned by the suspension of two savings banks, there would have been a decided movement in the iron trade. Here many of the shrewdest think the bottom has been reached in prices, and it is known that some of the sharpest buyers have lately taken pig metal to a considerable extent for the period of the year. Before March, unless the signs which are familiar to all at all conversant with the course of the iron market fail, there will be a demand for metal, which will cause regret to those who have blown out furnaces. This panic came without reason, and it is disappearing as suddenly as it came.

BLAST FURNACES FOR CALIFORNIA.

Even if the people of the Atlantic seaboard deplore the loss of trade and the dullness in iron making, the enterprising inhabitants of California propose utilizing their minerals, and to inaugurate the blast furnace industry on the Pacific coast. There are now being prepared, in this city, the drawings and specifications for two charcoal furnaces, 50 ft. high and of 9 ft. boshes, to be erected on the coast of California. These will be iron stacks, and have all the latest improvements. A feature of novelty in their construction is that the whole work for the furnaces will be done here in Philadelphia; that is, the brick, the iron for stack casing, columns, hot blasts, engines, &c., &c., will all be built here, and the whole shipped *via* Cape Horn to the Pacific coast. Another novel point, and to my knowledge never before used in this country in furnace construction, is that the backing for these stacks, between the iron casing and the lining or inwall, will be of crushed steatite concrete, soapstone abounding in the locality where the furnaces are to be erected. This method will be economical, and should furnish a highly desirable backing for the purpose. The enterprise shows that the people of California are earnest in developing all their minerals, of which iron, as time will show, is by no means the least valuable.

FOREIGN IRON INVESTMENTS.

Little notice is made either in the secular or trade press, probably from ignorance of the matter, of the amount of English capital quietly being invested in iron ore lands in this country. Such is, however, the case to a greater extent than is supposed. A large purchase has just been closed of iron and coal lands near Rome, Ga. Engineers are in the field examining lands in Alabama, which, if equal to representations, will conclude purchase of many thousand acres upon which development is to be immediately begun. Still other parties have in view purchases in the magnetic region of Lake Champlain, and negotiations are progressing, if sale has not been absolutely concluded, for a large property in the Adriondacks region. Two English parties are in the field for manganiferous ores for the manufacture of speigel, and a third, with abundant capital, projects the reduction of the titaniferous ores of Northern New York, which it is claimed can be practically and inexpensively done at some convenient point on the Hudson. We may be sure that the scarcity of ore, and high price of coal abroad, together with our boasted exports of American iron to England, have had their effect, and that if our English cousins will not buy our railroad bonds, or give us iron for them, they mean to take our iron lands and sell us cheap rails for our currency, on the spot. All the capital that can come and develop our ores and fuels is welcome and needed, and all the labor thus domiciliated on our soil is so much clear increase to our productive population, and so much stronger argument for the necessity of the already existing railway system. The question of competition is not one to be considered at all. Cheap iron means increased development of agricultural, mineral and all other resources, and if English capital becomes Americanized in the development of the minerals of Georgia, Tennessee, Alabama, Western Virginia, or New York, the question of benefit to the masses far outweigh that of any reduced profit to other local manufacturers. Such an era of activity as will follow such investments cannot but do much to settle the troubles of the Grangers and the transportation question, by providing a home demand for a great proportion of our agricultural products.

In this connection it is agreeable to notice that arrangements have been concluded by the American Land and Emigration Company, of London, by which large tracts of land have been placed in their hands for colonization, upon which several large colonies will be placed early in 1874, and with this all our gain by immigration in 1873 (fiscal year), was 460,000 people.

OCEAN STEAMSHIP STATIONS.

The latest sensation, and probably the boldest of its kind, presented to our capitalists, is a plan for establishing floating steamship stations in mid ocean. It is certainly novel, and may prove of great value to shippers. The idea is to construct air tight iron monitors, of a pear-shaped form, and with a breadth of beam of fifty feet. These vessels are to be divided into a hold for storage of fuel, a deck for stores, a second deck for quarters, and a turret for operating rooms. The monitor stations are to be securely anchored at fifty mile intervals between the coasts of England and the United States, and to be connected by telegraph cables. The advantages claimed are, the possibility of anchorage for vessels, the ability to send messages, the benefits to be derived by the signal corps as weather stations, and as places of refuge in cases of wreck or burning of vessels. The stations to be in charge of naval officers and under government direction. The obstacles to be overcome are the difficulty of obtaining anchorage, and of holding it if found, but these are pronounced by naval men by no means insurmountable, while the last, that of the difficulty of finding men willing to engage in such service, is too trifling to need notice. The plan is at first sight startling, but on investigation the very many advantages to be derived from it are clearly apparent, and it certainly deserves the notice of our shipping interests, as well as of the Navy Department.

NEW GRAIN ELEVATORS.

The unusual quantity of grain seeking export this season has severely taxed the capacity of the grain elevators here, and the Pennsylvania Railroad Company has been forced to increase the accommodations for loading vessels at the foot of Washington street, on the Delaware. The previous capacity of the elevator has been 10,000 bushels per hour. Three new extensions are in course of erection, two of which are for the Railroad Company, and one for the American Steamship Company; the first 300 feet long, and the last 750 feet, which will have a capacity of 4000 bushels per hour. Large floating elevators are also to be built. These new extensions are covered with corrugated sheet iron, and fitted up with the best machinery.

OUR INCREASED SHIPPING.

The report of the Register of the Treasury, as to our shipping statistics for the fiscal year, gives some highly interesting facts. When, a few years since, I used to chronicle in your columns the launch of each new iron steamer as an evidence we could build iron ships here against English competition, we did not expect to be able to note the completion of 26 of these vessels in one year, giving us a tonnage of American iron ships of 26,548 tons, or double that of 1872. The greatest increase shown, however, in our shipping is in the coasting trade, where we have added 1498 vessels this year, an increase of more than 233,000 tons of steam tonnage. Of sailing vessels we have added 294, a small percentage on the whole number of 17,655. The wooden ship building trade is thriving as it never did since the war. The panic has not hurt the Maine shipbuilders, and all the yards along that coast are doing a good business with a sure prospect that 1874 will witness a tonnage constructed equal to the best years before the war. The iron ship trade on the Delaware is in the same condition; no hands have been discharged, existing works are busy and have orders ahead. The shrewdest and oldest of the iron trade saw this prosperity coming, two years since, and have been shaping their mills accordingly. The new Millvale Works, of Graff, Bennett & Co., of Pittsburgh, with its extensive system of puddling under Danks' process, and plate rolls of a size which surprised the trade, was a move in this direction. The Abbott Iron Company, of Baltimore, are also ready to roll plates 100 inches wide, or beams 40 feet long. The new Phœnix mill, which, when completed, will make that works the largest on the continent, looks to shipbuilding for its business; and the Reading Railroad Company's Works, at Port Richmond, will be built solely for the construction of iron steam colliers, rolling plates of a size equal to any in the world. The next step of progress in this line will give us an American steel ship; which, if built on the plan of longitudinal framing, recommended by Mr. Samuel Holmes, and without riveting or bolting, by the aid of his welding machine, we will have reached the acme of perfection in metal ships—and yet five years ago all this was laughed at as impracticable.

The British Iron and Coal Trades.

The London *Times*, of Oct. 30th, thus sums up the latest views of the iron and coal trades:

The coal trade of the north of England continues pretty steady as regards the price of best and medium sorts. The demand for coals for the iron districts is very well sustained; but nuts and other small coals hang on the market, and stocks are not likely to be materially reduced except at rates considerably below the present quotations. For the past two years the great advance in the value of coals has entirely arisen through the excessive demand for them for manufacturing purposes. At one time it was so much in excess of the supply that coal owners could have nearly got what prices they liked. Duff and all kinds of rubbish which had lain about the pits in heaps, suddenly assumed a commercial value, were filled up, and were sent off to the factories, where they realized 7/ per ton profit. Coal owners got quite as good a comparative price for unscreened coals as for best households; and every ton of coals that could be acquired was greedily bought up for consumption in the iron trade, or for other manufacturing purposes. Coincident with the great prosperity and extension of the iron trade was the remarkable development of the iron steam shipping trade, not only in this country, but in other maritime states of Europe, and the price of steam coals more than doubled within a short period. Households and gas came up to the same level for the reason that a market was found for them other than through the ordinary channels of trade. Every intelligent person acquainted with the coal trade knew that these were the causes which operated in driving coals used for household purposes up to famine prices. They attached little importance to the statements made with regard to the alleged combination among the coal owners and the idleness and drunkenness of the pitmen; but they, along with the *Times*, have always maintained that so long as the extraordinary demand for coals for manufacturing purposes continued, there could be little reduction of price. These observations are being fully verified. The chemical, iron shipbuilding trades, and some other large consumers of small coals, have not been so busy during the past three months; the chemical trade, indeed, is very depressed. There has been no extra demand for this class of coals by sea, and the result has been that stocks of small coals have accumulated at nearly all the collieries, and any quantity may be had at from 5/ to 6/ per chaldron below the rates current in the early part of the year, and very little duff is now filled up from the heaps. These are the facts with regard to this particular branch of the Northern coal trade. The iron trade of the North remains in a comparatively vigorous state, but there is no speculative activity in it, neither is the coal trade of the North ruled by it. It goes on pretty uniformly from week to week. There is no excessive demand in the gas trade, which varies very little, and while business is steady in steam coal trade and prices are not materially changed, there is no speculative demand. The inquiry for households for the London market has been very good, but more money has had to be paid for freight in the London and coasting trades. It is thought, indeed, that there will be very little change in the price of coals until about Christmas, when numerous large contracts are generally arranged for the shipping season. The pitmen are working very steadily. Little more will probably be heard of the claim of the Durham men for an advance of 20 per cent. on their present wages. Yesterday common bars were firm at Wolverhampton, at £12. 10/ per ton; best bars, 40/ dearer; ordinary singles, £14. 15/; and best, £18. Finished iron orders are much sought after. Old orders are steadily running out. Pig iron is in good supply, at £7. 5/ for all mine qualities. Forge coal is in good supply, at 15/ to 16/ per ton. Household qualities very scarce. Colliery property is in great demand. Enormous prices are asked.

An Appeal for the Centennial.

The Executive Committee on the Centennial of the State of Pennsylvania, have issued the following address through their chairman, Hon. Wm. Bigler:

To the Members of the County Centennial Committees and the Public:

Although it has been deemed best to relax the efforts of the committee for a time, owing to the financial troubles, it is hoped that the impression may not be created that the programme as heretofore set forth is not to be followed up to successful result. The State, exclusive of the city of Philadelphia, will be looked to for not less than $500,000, and, so soon as business prospects brighten, the efforts heretofore employed to that end will be resumed with all the increased energy that the circumstances may demand. Meanwhile it is expected that county committees will adopt all preliminary steps to follow up the work.

The honor and dignity of the nation, in the judgment of this committee, are seriously involved in this noble enterprise. Through the acts of Congress and the proclamation of the President, the intention on the part of the United States to have a grand exhibition in Fairmount Park, in 1876, of an international character, has not only been presented to our own citizens, but to those of all other civilized nations, and through the State Department at Washington foreign governments have been invited to participate. It is apparent, therefore that nothing short of carrying out this intention in a manner befitting a great nation will save the people of the United States and their government from humiliation and the character of our country from reproach.

Pennsylvania, honored by being selected for the location of this great undertaking, will never suffer herself to be reproached for not consummating what she has begun as to the memorial building for the uses of the exhibition. With such a stake before us, the committee are confident no thoughtful citizen, whether in public or private life, will fail to do his part in this double work.

WILLIAM BIGLER, Chairman
State Centennial Executive Committee.
CHARLES B. NORTON, Secretary.

File Manufacture in Philadelphia.—The *Trade Journal* says: Our correspondent has been going around amongst the file men, to inquire concerning the trade and general prospects thereof. As most of our readers are aware, the file making business has, within the last ten years, made rapid progress in this city, as there are some six or seven principal firms engaged in making files and rasps, which are sold by most of the jobbing houses, and almost entirely used in the large machine shops of Philadelphia in preference to the imported goods. Being at home with the consumer they have the advantage of knowing exactly the kind of goods to make for their customers, and, consequently, have obtained the advantage over their foreign competitors. In fact, this city is known as the Sheffield of America in file making. Most of the manufacturers have small stocks on hand, having sold as fast as they manufactured them, and will therefore now be in a position to make up stock for an early spring trade, though they seem to be careful in accumulating stock as prices are on the decline, and from all appearances they will have to sell much lower this spring than last. Still, on the whole, the file trade is in a fair condition; several of the firms have made extensions to their workshops so as to meet any demands on them when trade is good.

The closing of iron works and factories in the neighborhood of Louisville has thrown about four thousand operatives out of employment.

English capitalists refuse to furnish money for the Canadian Pacific Railway scheme, and it is said the contract is to be abandoned and the surveyors recalled.

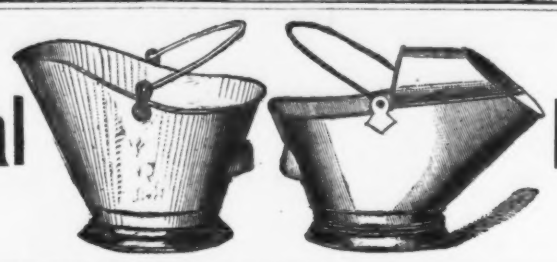
WM. RESOR & CO., Cincinnati.

VIENNA UNIVERSAL EXPOSITION

MEDAL OF MERIT AWARDED TO MONITOR

THE BEST COAL COOKING STOVE IN THE WORLD.

ELEVEN ENTIRELY NEW SIZES.



Coal Hods.

STAMPED CORRUGATED RIVETED BOTTOM IN SIX STYLES.

SMITH, BURNS & CO.,

Manufacturers of

Galvanized and Japanned Sheet Iron Goods and Tin Ware, Fry Pans, Broilers, Ash Cans, Garbage Buckets, Chamber Pails, Tea Kettles, Wash Boilers, Water Pails, Well Buckets, Toilet Ware, &c., &c. Exclusive manufacturers of the **Patent Combined Chamber and Commode Pail. Stamped and Planished Ware.**

Warehouse, 46 Cliff Street, between Beekman and Fulton Streets, NEW YORK.

THE PALACE COAL VASE.

A COAL VASE

AND

Shovel & Tongs

STAND

COMBINED.

PATENTED

December 24th, 1872.

ORNAMENTAL,

Clean and Convenient.

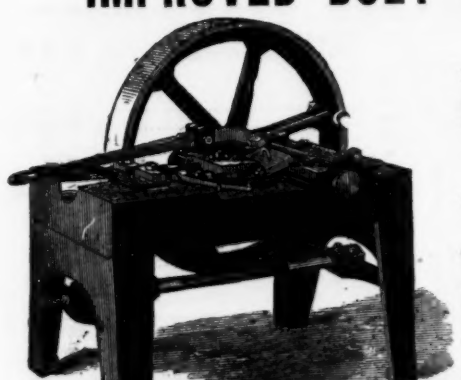
Dealers will find them very saleable, as they are the most popular Coal Vase in market. Illustrations and prices supplied upon application. Address the

Sole Manufacturers,

SIDNEY SHEPARD & CO., Buffalo, N. Y.

AGENTS.—VAN WART & McCOY, 43 Chambers Street, N. Y.; SHEPHERD & LLOYD, 405 Commerce Street, Philadelphia.

IMPROVED BOLT MACHINERY.



BOLT HEADER,

That will head 10,000 per day.

Single & Double Head

BOLT CUTTERS,

That will cut from 5000 to 10,000 per day.

Bolt Pointers, Tapping Lathes, Tire Blank and Rivet Headers, Engine Lathes, &c.

Manufactured by

THE

Chapin Machine Co.,

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WILSON MANUFACTURING COMPANY.,

NEW LONDON, CONN.

MANUFACTURERS OF

SOLID BOX VISES.

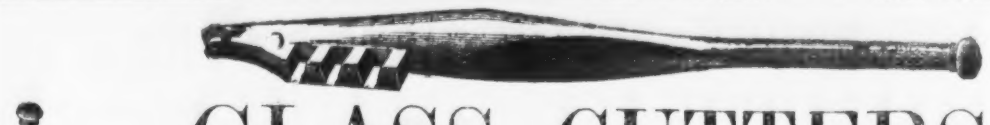
With or without Convex and Concave Washers.

Jackscrews, Braces, Coffee Mills, Turning Lathes; Clamp Heads and Screws, Parallel Bench Vises, Sash Pullies, Hog House Pullies, Composition Cocks, Bench Screws, Vise Screws Gridirons, Drill Stocks and Bows, Box Chisels, Rivets, Sheaves, Block Pins, Composition Roller and Iron Bushings, Riggers' Screws, Caulkers' Tools, Pump Chambers, Relaying Pins, Marlin Spikes, Malleable Iron Castings, and Genera Hardware.

GALVANIZING DONE TO ORDER.

WILSON MFG. COMPANY,

Warehouse 37 Chambers St., N. Y.



GLASS CUTTERS.

Our Glass Cutters are made with a handle like a Glaziers' Diamond, but instead of the diamond point they have a small hardened steel revolving wheel, the sharp edge of which cuts nearly as well as a diamond. They are durable and will give entire satisfaction.

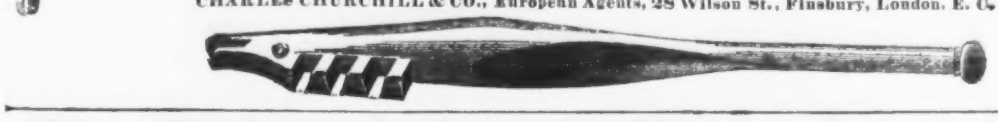
Most Hardware Dealers keep them, or will send to us for them if wanted. Where they are not for sale, we will send one by mail, prepaid, on receipt of thirty-five cents. We will send one to any publisher who will insert this notice and forward us a copy prepaid.

MILLERS FALLS CO.,

78 Beekman Street, New York.

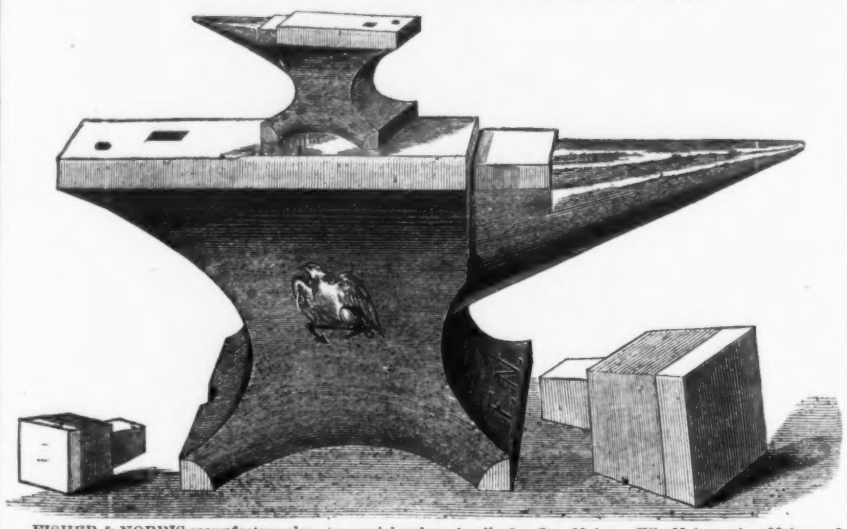
Also Manufacture Barber's Bit Braces, Parallel Vises & Drilling Machines.

CHARLES CHURCHILL & CO., European Agents, 28 Wilson St., Finsbury, London, E. C.



The Fisher & Norris Eagle Anvil Works.

(ESTABLISHED 1843.)



These Anvils are manufactured at the oldest Anvil Factory in this country, and for the past twenty-five years have maintained an excellent reputation among Blacksmiths, Machinists, Tool Makers, &c. They are *superior* to the best English, or other Anvils, on account of the peculiar process of their manufacture (invented and used only by this concern), and from the quality of the materials employed.

The working surface is in *one piece* of JESSUP'S BEST TOOL CAST STEEL, which, after being accurately ground, is hardened and given the proper temper for the heaviest work. The *horn* is covered with and its extremity made *entirely of steel*. The body of the Anvil is of the strongest grade of American iron, to which the cast steel face is *warranted to be thoroughly welded and not to come off*.

The best of English Anvils, after a time, become hollowing on the face by continued hammering in use, on account of the fibrous nature of the wrought iron—causing it to "settle" under the face.

The body of the Eagle Anvils being of crystallized iron, no such settling can ever occur; and the steel face, therefore, remains perfectly true. Also, it has the great advantage that being of a more *solid* material, and consequently with less rebound, the piece being forged receives the full effect of the hammer, instead of a part of it being wasted by the rebound, as is the case from a wrought iron anvil. An equal amount of work can, therefore, be done on this Anvil with a *hammer one-fifth lighter* than that required when using a wrought iron anvil which is more elastic.

FISHER & NORRIS manufacture also, to special order, Anvils for Saw Makers, File Makers, Axe Makers, &c; also, Copper Smiths', Silver Smiths' and Tinmen's Stakes and Blocks, with hardened and polished cast steel faces, and the well known Double Screw Parallel Vise.

REDUCED PRICE LIST, November 1st, 1873.

ANVILS weighing 100 lbs. to 800 lbs., 11 cts. per lb.

Smaller Anvils, ("Minims.")

No.	0	1	2	3	4	5	6	7	8	9
Weighing about	10 lb.	15 lb.	20 lb.	30 lb.	40 lb.	50 lb.	60 lb.	70 lb.	80 lb.	90 lb.
Price,	$3·50	$4·25	$5·00	$5·50	$6·50	$7·50	$8·00	$9·00	$10·00	$10·50

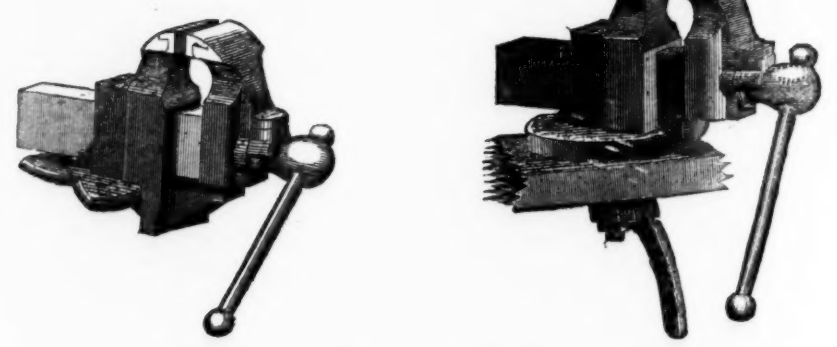
THESE GOODS ARE SOLD BY OUR AGENTS (with special discounts to the trade).

New York.—Messrs. CLARK, WILSON & CO.—RUSSELL & ERWIN MANUFACTURING COMPANY.—Messrs. DURRIE & RUSHER. Boston.—Messrs. GEORGE H. GRAY & DANFORTH. Philadelphia.—Messrs. JAMES C. HAND & CO. Baltimore.—Mr. W. H. COLE.

FISHER & NORRIS, Trenton N. J., Manufacturers.

HOWARD

PARALLEL BENCH VISE.



Manufactured at the

HOWARD IRON WORKS,

Buffalo, N. Y.

RUSSELL & ERWIN MANUFACTURING CO.,

New York and Philadelphia, Agents.

MINOT & CO., Oliver Street, Boston,

Selling Agents Lowell Wrench Co.'s

TRIPLE ACTING RATCHET DRILL, the Simplest, Cheapest and Best.

MANUFACTURERS OF

HAMMERS,

Sledges,

BLACKSMITHS'

AND

Stone Masons'

TOOLS,

Bush Hammers,

etc., etc.

AGENTS FOR

Washoe Picks,

Western Files,

Sweet's Crow Bars,

N. Carolina Handles,

Steel Foundry Riddles,

Beaver Falls Cutlery,

etc., etc.

Send for Price Lists and Discounts.

New York Wholesale Prices, November 19, 1873.

HARDWARE.

Anvils.
Solid Cast Steel ... ℘ ℔ 14c
Wright's ... ℘ ℔ gold 12c; over 250 ℔s 12½c, gold
Armitage's Mouse Hole ... gold 12c
Wilkinson's ... ℘ ℔ gold 11½c
Eagle Anvil Co. ℘ ℔ 11c ... dis 15 @ 15&5 %

Apple Parers.
Turn Table, Lightning, Conqueror ... } $8·50 ℘ doz
Reading ... ℘ doz 9 00
Union ... ℘ doz 9 00 }
Bay State, Paring, Coring and Slicing ... 15 00 } dis
Skeleton " " " ... 9 00 } 5 %
Climax Slicer ... 9 00 }
Bay State Peach Parer ... $11 00 @ 11 50
Lightning " " ... 11 00 @ 11 50
Peach Stoner and Halver ... 7 00

Augers and Bits.
Snell Mfg. Co ... dis 15 @ 20 %
Russell Jennings ... dis 10 %
Douglass Mfg. Co., Extra ... dis 30 %
" " No. 1 ... dis 30&5 %
" " Hollow Augers ... dis 25 %
Cushman's Expanding Hollow Augers ... 4 50 each, net
Ives' ... dis 30 %
" Hollow Augers ... dis 30 %
" Expansive Augers ... dis 30 %
" " Bits ... dis 25 %
Andrews' Bits ... dis 30 %
Cook's Patent Augers ... dis 30&10 %
" " Bits ... dis 25&10 @ 30&10 %
Shepardson's Double Cut Bits ... dis 20 %
Griswold's Patent ... dis 20 %
Cast Steel Cut Augers ... dis 30&10 %
" Auger Bits ... dis 30&10 %
Long Augers ... new list dis 30 %
Bonney's Patent Hollow ... $48 per doz—dis 25 %
Stearns' " " ... $48 per doz—dis 30 %
Morse's Bit Stock Drills ... dis 20 %

Axes.
Blood's ... $12 50 @ 14 00
Hunt's ... ℘ doz $15 00 @ 17 50 net @ dis 5 %
Collins' ... ℘ doz 12 00 @ 16 00 net @ dis 5 %
Hurd's ... ℘ doz 12 50 @ 13 50
Schweitzer Mfg. Co.'s ... ℘ doz 13 00 @ 15 00
Simmons' ... ℘ doz 12 00 @ 13 50
Morris' ... ℘ doz 12 50 @ 13 50
Red Jacket ... ℘ doz 12 00 @ 12 50
Mann's ... ℘ doz 12 50 @ 13 00
" Double Bitted ... ℘ doz 21 50 @ 22 00
Powell Tool Co., "Peerless" ... ℘ doz 13 00 @ 14 50
Underhill's ... ℘ doz 12 50 @ 13 50
" Crown ... ℘ doz 13 00 @ 14 00
John Leverett's ... ℘ doz 12 50 @ 15 50

Balances.
Chatillon's, Frary's, Morton's ... } new list dis 15 %

Bands.
Plated ... add 10; dis 5 %
Iron ... dis 15&5 %
Brass (Plated list) ... dis 5 %
Oroide ... add 15; dis 5 %

Bells.
Hand, Light Brass ... dis 60&10 %
White Metal ... dis 45&10 %
Globe ... dis 20 %
Swiss Hand ... dis 10 %
Abbe's ... dis 10&10 %
Taylor's Patent Door ... net
Western Gong ... net
Brook's Crank ... net list
" Pull ... dis 15 %
Hart Mfg. Co., Crank and Pull ... dis 20&10 %
Cow—Common Wrought ... dis 20&10 %
Western ... new list dis 33⅓ %
Kentucky "Star" ... new list dis 20 %
Dodge's Genuine Kentucky ... new list dis 25 %
Yaw's Genuine ... dis 20 %

Bellows.
Blacksmiths' ... dis 10 %
Moulders' ... dis 15 %

Blind Fasteners.
Van Sand's ... ℘ gross $14 00
Washburn's Patent ... ℘ gross 14 00
Merriman's ... add 35 @ 40 %

Blind Staples.
Boardman's Patent, ½ in. and larger ... ℘ ℔ 37½c
" ⅜ in ... " 42 c

Bolts.
Carriage and Tire, Ætna Nut Co ... dis 60 %
Stove, Ætna Nut Co ... dis 10&5 %
Cast Iron Barrel, Shutter, &c ... old list dis 50&10 %
Wrought Iron Barrel ... net
" " Square ... dis 10&10 %
Carriage and Tire, Common ... dis 70&10 %
" " " Norway Iron ... dis 40 %
Star, Philadelphia ... dis 50 @ 50&10 %
Eagle, Philadelphia ... dis 50 @ 50&10 %
Skelly's Phila. Norway Iron Finished Points ... dis 5 &5 %
Philadelphia Pattern, P. S. & W ... dis 50&10 %
Carriage and Tire, R. B. & W ... old list dis 50&5 %
Plow, R. B. & W ... dis 30 %
Stove, R. B. & W ... dis 10 %
" Shelton Co. Shaved Heads ... dis 15 %
Union Nut Co., old list ... dis 50&15 %
Machine ... dis 25 @ 30 %

Borax.—Per case of 100 lbs ... ℘ ℔ 22c

Boring Machines.
Kellogg's ... dis 10 @ 15 %
Snell Mfg. Co., Rice's Patent ... dis 15 %
" " Regular ... dis 15 %
Douglas Mfg. Co ... dis 20 %
Hovey's Angle ... $6 00 @ 6 25
" Upright ... 4 25 @ 4 50
Morticing Machines each ... $18 00

Bow Pins ... dis 45 @ 50 %

Braces.
Barber's Patent ... dis 40 %
Wilson Mfg. Co ... net @ add 5 %
Spofford's Patent ... dis 40 %
Noble's Patent ... dis 33⅓ %
Bartholomew's American Ball ... dis 10&10 %
" Patent Grip ... dis 40 %
Q. S. Backus & Co ... dis 30&10 %

Bung Hole Borers.
Common and Ring ... dis 20 %
Enterprise Mfg. Co ... dis 20&5 %
Ives' Tap Borers ... dis 20 %

Butchers' Cleavers.
Bradley's ... dis 15 %
Beatty's ... new list dis 10 %

2	3	4	5	6	7	8	9
$19·00	$21·50	$24·00	$27·00	$30·00	$33·50	$36·50	$40·00

Hart Mfg. Co ... dis 45&10 %

0	1	2	3	4	5	6
$25·25	$29·75	$30·25	$38·75	$43·55	$48·50	$54·00

Butts.
Wrought Brass ... new list dis 20 %
Cast Fast Joint, Narrow ... dis 40 %
" " Broad ... dis 40 %
Cast Loose Joint ... dis 50 %
" " Mayer ... dis 40 %
" " Parliament ... dis 40 %
Loose Pin ... dis 40&10 %
Wrought Fast Joint, Narrow ... dis 30 @ 30&5 %
Wrought Broad ... dis 35 %
" Loose Joint ... dis 35 %
Wrought Table and Back Flaps ... dis 25 @ 25&5 %
Cast Butts, Ohio Butt Co.—
Narrow Fast, Drilled and Wire Jointed (old list) ... dis 35 %
Broad Fast, Drilled and Wire Jointed ... dis 35 %
Broad, Loose, Drilled and Wire Jointed ... dis 45 %
Silver Tipped ... dis 45 %
Loose Joint, Japanned ... dis 25 %
Loose Joint, Acorn and Silver Tipped ... dis 40 %
Palmer Blind Butts ... dis 30&10 %
Nicholson Blind Butts ... dis 40&10 %
Parker's Blind Butts ... dis 40&10 %
A. S. Parker's ... dis 40&10 %
Clark's Surface Blind Hinges, Nos. 1, 3 and 5 ... dis 40&10 %
" " " " No. 20 ... dis 50&5 %
" Mortise " " ... dis 30&5 %
Seymour's ... dis 40&10 %
Shepard's ... dis 40&10 %
Garretson's ... dis 40&10 %
The American Spiral Spring Butt Co ... dis 25 %
Standard ... dis 40&10 %
Union Mfg. Co.—
Drilled and Wired Cast Fast ... dis 35 %
" " " " Loose ... dis 45 %
Loose Joint Japanned or Silvered Acorn ... dis 40 %
" " Figured Enameled ... dis 25 %
" " Nickel Capped ... dis 30 %
" " Solid Bronze ... dis 10 %

Caps—Percussion, per 1000.
G. D ... 40c
Ely's E. B ... 1-4s, 60c.; 1-10s, 67½c., gold
" Double Waterproof, 1-4s, $1·50; 1-10s, $1·57½c., gold
Colt's ... 1-4s, 72½c; 1-10s, 82½c., gold

Cartridges.
Metallic ... dis 50 %

Cards.
Horse and Curry ... dis 25&10 %
Cotton ... new list dis 10&10 %
Wool ... new list dis 10&10 %

Casters.
Iron and Wood Wheel Plate ... new list dis 20&10 %
Brass Wheel Plate ... new list dis 20&10 %
Porcelain Wheel Plate ... new list dis 20&10 %

Chain.
English Coil ... net gold

℘ ℔	13½	10	9½	8½c	8½	8¼c
	3-16	¼	5-16	⅜	7-16	½

Trace, 6½-10-2 ... ℘ pair, gold, 62c
Trace, 7-10-2 ... ℘ pair, gold, 67c
Galvanized Pump Chain ... ℘ ℔ 14c
German Halter Chain ... new list, gold, dis 25 %
German Coil ... new list, gold, dis 25 %
Jack Chain, Iron ... dis 35 @ 40 %
" Brass ... dis 20 @ 25 %

Chalk.
White ... ℘ gross, 60c
Red ... ℘ gross, 80c
Blue ... ℘ gross, 90c
Crayons ... ℘ gross, 14c

Cherry Stoners.
"Family" ... ℘ doz $9·00

Chisels.
Socket Firmers ... dis 60&5 @ 60&10 %
Socket Framing ... dis 60&10 %
Socket Corner ... dis 60&10
Tanged Firmers ... dis 40 to 40&10 %
Butcher's ... $5·50 to £ gold—new list
Newbould's ... $5·50 to £ gold
Spear & Jackson's ... $5·50 to £ gold—new list

Clips, Axle.
Norway or Best ... dis 20 @ 30 %

Superior ... dis 40&5 %
"Star," Superior Philadelphia ... dis 45&5 %

Coal Shovels.
Iron Handled ... ℘ doz, $ 85 @ 1 25
Wooden Handled ... ℘ doz, 1 00 @ 2 00

Coal Hods.
Smith, Burns & Co ... dis 25 %

No.	14	15	16	17	18	
Japanned	$12·00	12·75	13·50	15·50	18·00	per doz
Galvanized	15·00	16·00	17·50	19·50	22·50	"

No.	14	15	16	17	18	
Common Japanned	$9·00	9·75	10·50	12·00	13·50	per doz
" Galvanized	13·00	14·50	15·50	17·00	19·50	"

Common Japanned ... dis 50&10 %
" Galvanized ... dis 40&10 %

Cocks.
Brass Racking ... dis 20&10 %
Lock and Globe ... dis 20&10 %

Coffee Mills.
Board and Box ... dis 15 %
Increase Wilson's ... new list dis 10 %
Selsor's Pat ... $9·50, $10·50—dis 20 %
French Steel ... dis 10 @ 20 %
"Champion" ... dis 20 %
Swift's ... dis 20 %

Compasses and Dividers.
Bemis ... dis 15&15 @ 20&5&15 %
Excelsior ... dis 30 %
Peck Stow & Wilcox ... dis 25 %

Coopers' Tools.
Bradley's ... dis 15 @ 20 %
Chas. E. Little ... dis 15 @ 20 %

Corn Knives and Cutters.
Bradley's ... list net

Crucibles.
Gautier & Co ... ℘ No. 5½c

Curry Combs.
Hotchkiss' and Kellogg's, Iron and Brass ... dis 15 %
Fitch's ... dis 15&10 %
Ruggles' ... dis 15 @ 20 %
Rubber ... ℘ doz, $9·00—dis 10 %
Schweitzer Mfg. Co ... dis 20 %

Curtain Pins.
Silvered Glass ... dis 40&10 %

Cutlery.
American Table ...
American Pocket ... dis 15 %

Door Springs.
Gray's ... $7·50 per doz—dis 40&10 %
Torrey's Patent ... $7·50 ℘ doz—dis 40 @ 40&10 %
Palmer's Japanned No. 6 ... ℘ doz $5·00
" Coppered " ... " 6·00
" Silvered " ... " 8·00
Challenge.—
Japanned ... ℘ doz $4 00 @ 6 00
Bronzed ... ℘ doz 5 00 @ 7 00
Nickel Plated ... ℘ doz 6 50 @ 9 00
1 Gross lots ... dis 10 %
5 Gross lots ... dis 20 %

Drawing Knives.
... dis 60 @ 60&10 %
Bradley's ... dis 25 %

Drills.
Ingersoll's Ratchet ... dis 25 %
Moore's Triple Acting Ratchet ... dis 20 %

Egg Beaters.
Monroe's ... ℘ doz net $8·25 @ 8·50
Ashley's ... ℘ doz net 2·25 @ 3·00
Earle's Patent ... ℘ doz net 5·50 @ 6·00
Pratt's Aerating ... dis 10 %
Dover ... ℘ doz net $6·00

Emery.
Genuine Chester—Regular Nos ... ℘ ℔ 8c } dis 5 @ 10 %
" Flour and FF ... ℘ ℔ 5c }
Washington Mills—Regular Nos ... ℘ ℔ 8c
" Flour ... ℘ ℔ 5c

Enameled and Tinned Ware.
Kettles ... dis 15 %
Sauce Pans, Glue Pots, &c ... dis 10 %

Faucets.
Cork Lined, Wood ... dis 60 %
Fenn's ... dis 50 %
" Cork Stops ... dis 40 %
Star ... dis 55&10 %
Frary's Patent Petroleum ... dis 10&10 %
Taylor's Pattern " ... dis 20&10 %
Wood and Metallic ... dis 40 %

Files.
Nicholson ... $5 00 to £ currency
Newbould's ... 5 50 to £ gold
J. & Riley Carr's ... 5 50 to £ gold
" " Rasps ... 5 75 to £ gold
Stubs' ... 8 50 to £ gold
Butcher's ... 5 50 to £ gold
Spear & Jackson's ... 5 50 to £ gold
Hargreaves, Smith & Co.'s ... 5 00 to £ gold
Jowitt's ... 5 25 to £ gold
"Western" ... 5 00 to £ net
W. K. & C. Peace's "Imperial" ... 5 25 to £ gold
R. Ibbotson ... 5 00 to £ gold
Beam & Murray, "Cyclops" ... 4 85 to £ gold
Fisher's ... 4 75 to £ gold
Goodlad's ... 4 00 to £ gold
Moss & Gamble ... 5 25 @ 5 50 to £ gold

Fluting Machines.
Acme ... $7 00 each net
Cole ... 5 75 each net
Manville, No. 2 ... 7 00 each net
Knox, with 4-inch Rolls ... 5 00 each net
" " 6 " ... 6 00 each net
O. K ... 6 50 each net
Peerless, 4-inch Rolls ... 4 00 each net
" 5 " ... 5 00 each net
Excelsior, No. 1 ... 4 75 each net
" No. 2 ... 6 50 each net
Diamond ... 7 50 each net
Climax 7-inch Rolls ... 8 00 each net
" 4½ " ... 6 50 each net
Empire ... 4 00 each net
Eureka, No. 1, 7-inch Roll ... 8 00 each net
" No. 2, 5-inch Roll ... 6 00 each net
K. F. M., 4-inch Roll ... 5 50 each net
" 6-inch Roll ... 6 00 each net
Myers' Fashion Fluter, 4½-inch Rolls ... 3 00 each net
" Convex Brass Fluter, Sad Iron attachment ... $1·75
Domestic Fluter ... $1·75 each net
Fairy, Self-Heater ... 10 00 each net
National, 5-inch Rolls ... 5 00 each net
Ponton Fluter, Bright ... $1 50—dis 25 %
" " Galvanized ... 2 00—dis 25 %
Geneva Hand Fluter ... $1 25 each net

Fry Pans.
Tinned ... dis 20 %

℘ doz	$3·00	3·25	3·62	4·00	4·50	5·00	5·50	6·00	7·50
No.	0	1	2	3	4	5	6	7	8

Peck, Stow & Wilcox ... dis 25 %
Smith, Burns & Co., "Excelsior" Polished ... dis 20 %

℘ doz	$3·70	4·00	4·70	5·30	6·00	7·00	8·00	9·00
No.	1	2	3	5	6	7	8	

Hammers.
Emmet Hammer Co ... dis 10 %
Maydole's ... new list net
Cheney's ... new list net
Verree ... dis 5 %
Yerks & Plumb ... new advanced list dis 5 @ 10 %
Minot & Co ... dis 15 %

Handles.
Hammer and Hatchet ... dis 10 %
Quakertown, Axe, Pick and Sledge ... dis 10 %
" Hammer and Hatchet ... net
Greensboro', Axe, Pick, Hammer, &c ... dis 10 %
Woolworth Axe, Pick and Sledge ... dis 10 %

Harness Snaps.
Judd's ... dis 30 %
Fitch's ... dis 30 %

Hatchets.
Isaiah Blood ... dis 10 %
Shingling, Nos. 1 2 3 ... ℘ doz $7 50 8 00 8 50
Claw, " 1 2 3 ... ℘ doz 8 50 9 00 9 50
Lathing, " 1 2 3 ... ℘ doz 7 50 8 00 8 50
Hunt's ... net
Shingling, Nos. 1 2 3 ... ℘ doz $7 25 8 00 8 75
Claw, " 1 2 3 ... ℘ doz 7 75 8 50 9 25
Lathing, " 1 2 3 ... ℘ doz 7 50 8 25 9 00
Hurd's ... dis 20 %
Shingling, Nos. 1 2 3 ... ℘ doz $8 00 8 50 9 00
Claw, " 1 2 3 ... ℘ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ... ℘ doz 8 00 8 50 9 00
Newark's Edge Tool Co.'s ... dis 25 %
Shingling, Nos. 1 2 3 ... ℘ doz $6 50 7 00 7 50
Claw, " 1 2 3 ... ℘ doz 7 25 7 75 8 25
Lathing, " 1 2 3 ... ℘ doz 6 50 7 00 7 50
Yerks & Plumb ... dis 10 %
Shingling, Nos. 1 2 3 ... ℘ doz $7 00 7 50 8 00
Claw, " 1 2 3 ... ℘ doz 7 50 8 00 8 50
Lathing, " 1 2 3 ... ℘ doz 7 00 7 50 8 00
Simmon's ... dis 10 @ 15 %
Shingling, Nos. 0 1 2 3 ... ℘ doz $7 50 8 00 8 50 9 00
Claw, " 1 2 3 ... ℘ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ... ℘ doz 8 00 8 50 9 00
Broad, " 1 2 3 ... ℘ doz 9 00 10 00 12 00
" " 4 5 6 ... ℘ doz 14 00 16 00 18 00
" " 7 8 ... ℘ doz 20 00 22 00
Elephant ... dis 20 %
Shingling, Nos. 1 2 3 ... ℘ doz $8 00 8 50 9 00
Claw, " 1 2 3 ... ℘ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ... ℘ doz 8 00 8 50 9 00
J. P. Verree & Co ... dis 5 %
Shingling, Nos. 1 2 3 ... ℘ doz $7 00 7 50 8 00
Claw, " 1 2 3 ... ℘ doz 7 50 8 00 8 50
Lathing, " 1 2 3 ... ℘ doz 7 00 7 50 8 00
Underhill's ... dis 10 %
Shing'ing, Nos. 1 2 3 ... ℘ doz 7 25 8 00 8 75
Claw, " 1 2 3 ... ℘ doz 7 75 8 50 9 25
Lathing, " 1 2 ... ℘ doz 11 00 12 00

Hinges.
Wrought Strap and T ... dis 30&10 %
Providence Plate ... { 6 and 8 in. list 11c. / over 8 in. list 9½c. } dis 10&5 %
Screw Hook and Strap ... { 8, 10, 12 in. 8c / 14 to 36 in. 6½c } ... net
Heavy Welded Hook ... { 8 to 12 in., 9c / 14 in. & up, 8½c } dis 10 %
Screw Hook and Eye ... { ⅝ to 1 in., 9½c / ⅜ in. 10½c / ¼ in. 12½c } ... net

Hoes.
Solid Shank, C. S ... ℘ doz $8 00—dis 20 @ 25 %
Socket ... ℘ doz 9 00—dis 20 @ 25 %
Riveted Eye ... ℘ doz 5 00—dis 20 @ 25 %
Grub ... dis 20 %
Planters'—Winsted ... add 10 %
Scovill ... add 33⅓ %
Scovill Pattern (Winsted) ... add 20 %

Hooks.
Belt ... dis 50 %
Bench ... ℘ doz net $5 00 @ 8 50
Wardrobe, Japanned ... new list dis 10&10 %
Hat and Coat " ... new list dis 15&10 %
Wrought Staples and Hooks and Staples ... dis 60 %
Wrought Hasps and Staples and Hasps, Hooks and Wrought Staples ... dis 60 %

Screw Hooks and Eyes, revised list ... dis 65&10 %

Horse Nails.
Putnam's.

No.	5	6	7	8	9	10
	32c	28c	26c	25c	24c	23c

In lots 2000 lbs. dis. 5 %.
Ausable

No.	5	6	7	8	9	10
	30c	7c	25c	24c	23c	22c

In lots of 1000 lbs. 5 % discount.
Brundage.

No.	5	6	7	8	9	10
	29c	26c	24c	23c	22c	21c

In lots of 500 lbs., dis. 5 %.
American Pressed.

No.	5	6	7	8	9	10
	22c	20c	20c	20c	20c	20c

In lots of 1000 lbs. dis 5 %.
Perkins Finished (ready to drive).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs. dis 5 %.
Buffalo Forged.

No.	6	7	8	9	10
	28c	26c	25c	24c	23c

Globe (Pointed and Polished).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs., 5 % discount.
National (Pointed and Polished), Extra Finish.

No.	5	6	7	8	9	10
	30c	27c	25c	24c	23c	22c

In lots of 1000 lbs., dis 5 %.
Vulcan (Blued, pointed, ready to drive).

No.	5	6	7	8	9	10
	33c	30c	28c	27c	26c	25c

In lots of 500 lbs., 5 % discount.
" 1000 lbs 7½ % discount.
New London Horse Nails.

No.	6	7	8	9	10
Great Western	27c	25c	24c	23c	22c
U B	29c	27c	26c	25c	24c

In lots of 1000 lbs., dis 5 %.
Star Brand ... ℘ ℔ 16c
Morgan ... 16c

Horse Shoes.
Burden ... ℘ keg, $6 37½
Shoenberger ... ℘ keg, 6 37½
R. I. Horse Shoe Co., Perkins Pattern ... ℘ keg, 6 37½
" " R. I. Pattern ... ℘ keg, 6 87½
Mule Shoes ... ℘ keg, 7 37½

Kettles.
Enameled ... dis 15 %
Brass ... ℘ ℔ 55c net
In lots of 500 ℔s ... ℘ ℔ 50c net

Knives.
Ames' Butcher Knives ... dis 20 %
" Shoe " ... dis 15 %
Hay and Straw, "Wadsworth's" ... dis 20 %

Knobs.
Base—Common ... net
" Plush Tip ... dis 10 %
" Elastic End ... reduced list dis 10&10 %
Trenton Lock Co ... dis 40 %

Lanterns.
Brady's Patent ... dis 10 %
Ætna ... dis 10 %
Yankee ... dis 10 %
De Beque ... dis 10 %

Locks and Latches.
Cabinet—Eagle ... dis 25 %
Cabinet—Gaylord ... dis 25 %
Trunk ... dis 10 %
Continental ... dis 15 %
Shepardson's ... dis 20 %
Trenton Lock Co ... dis 40 %
Branford ... dis 40 %
Norwich ... dis 40 %

Meat Cutters.
Dixon's (P. S. & W.) ... dis 10 %
No ... 1 2 3 4
℘ doz ... $14 00 $17 00 $19 00 $30 00
Hales' ... dis 25 %
No ... 11 12 13
℘ doz ... $27 00 $33 00 $42 00
Niles Challenge ... dis 20 %
No ... 1 2 3
℘ doz ... $22·00 $30·00 $40·00
Perry's Champion (P. S. & W.) ... dis 10 %
No ... 200 300 400
℘ doz ... $22 00 $27 00 $40 00
Woodruff's (P. S. & W.) ... dis 10 %
No ... 100 150
℘ doz ... $15 00 $18 00
American ... dis 25 @ 25&5 %
No ... 1 2 2½ 3 4 5
Each ... $6 00 $9 00 $14 00 $15 00 $30 00 $75 00

Molasses Gates.
Stebbins' Pattern ... dis 60&10 %
Tinned ends ... dis 40&10 %
Weed's Patent Self-Boring ... dis 15 %
" without Auger Bit ... dis 40 @ 50 %
Patent Self-Measuring ... per doz $42 00—dis 20 %

Mouse Traps.
Wood Choker ... ℘ doz holes, 16 @ 20c

Nails.
10d Cut (Standard) ... $4 75

Nuts and Washers.
Nuts ... large, 4c; small, 5c off list.
Washers ... large, 5c; small, 7c off list.

Oil Stones.
Washita No. 1 ... ℘ ℔ 22c
" Slips ... ℘ ℔ 44c
Hindostan ... ℘ ℔ 6c dis 10 %
" Slips ... ℘ ℔ 10c dis 10 %

Oilers.
Olmsted's ... dis 25&10 %
Broughton's ... dis 25&5 %
Common Zinc, Brass and Copper ... dis 25 %

Picks.

Washoe R. R. Nos.		1	2	3	4	5
℘ doz		$14·00	15·00	16·00	17·00	18·00
Washoe Coal, "	$8·50	9·00	10·00	11·00	13·00	15·00

Picture Nails and Knobs.
Richards' Patent ... dis 40 @ 40&10 %

Planes.
Sandusky Tool Co., 1st quality ... dis 20 %
" " 2d " (Ogontz) ... dis 20&10 %
Ohio Tool Co., 1st quality ... dis 20 %
" " 2d quality (Sciota) ... dis 20&10 %
Owasco Tool Co., 1st quality ... dis 25 %
" " 2d quality ... dis 25&10 %
Plane Irons ... list net
" Butcher's ... $5 50 to £ gold—new list
" Ohio Tool Co ... list net
" Spear & Jackson's ... 5 50 to £ gold—new list
" Sandusky Tool Co ... list net

Plumbs and Levels
Standard Rule Co.'s New Adjustable ... dis 50&10 %

Pumps.
Douglas Cistern, etc ... new list dis 25 %
" S. & F ... new list dis 20 %

Rakes.
Cast Steel ... dis 25 %
$8 00 9 00 10 00 11 00
8 10 12 14 teeth.

Razor Straps.
Genuine Emerson ... dis 25 %
" " in 5 gross lots ... dis 30 %
Hunt's ... dis 25&10 %
Chapman ... dis 10 @ 15 %

Rivets.
Iron and Tinned ... dis 25 %
Copper Rivets and Burrs ...

Rods.
Stair ... new list dis 25 %
American Patent ... dis 25 %

Rope. Manufacturers' List
Manila ... ½ inch and larger ℘ ℔ 17½c
" ... ⅜ inch ℘ ℔ 18 c
" ... ¼ and 5-16 inch ℘ ℔ 18½c
" Lath Yarn ... ℘ ℔ 18½c
" Hay Rope ... ℘ ℔ 18 c
Sisal ... ½ inch and larger ℘ ℔ 15½c
" ... ⅜ inch ℘ ℔ 16 c
" ... ¼ and 5-16 inch ℘ ℔ 16½c
" Hay Rope ... ℘ ℔ 16 c

Rules.
Hubbard & Curtiss Mfg. Co ... new list net
Stanley Rule and Level Co.'s Ivory ... dis 50&10 %
" " " Boxwood ... dis 60&10 %
Standard Rule Co.'s Boxwood ... dis 60&10 %
" " " Ivory ... dis 50&10 %

Sad Irons.
... ℘ ℔ 4½c net
Sad Iron, Nickel Stand attached ... ℘ ℔ 9c

Sand Paper—dis 7½ @ 10 %
Beader & Adamson's (Flint) 00 to 1½ ... $4 50 ℘ ream
" " " 2, 2½ & 3 ... 5 00 "
Assorted ... 4 50 "
Star ... ℘ ream $3 50
Emery ... ℘ ream $7 00 @ 12 00
Cowdin Mfg. Co ... dis 7½ @ 10 %
Diamond Flint, 00 to 1½ ... per ream $4 50
" " 2, 2½, 3 and assorted ... " 5 00
" Emery Paper ... per ream $7 00 to 12 00

Sash Locks.
Clark's ... dis 20 %
Ferguson's ... dis 20 @ 25 %
Champion ... ℘ gross $13 00 @ $15 00
Norwich ... dis 15 %

Sash Weights.
Solid Eyes ... ℘ ℔ 2½c

Sausage Fillers.
Perry's (P. S. & W.) ... dis 10 %
No ... 1 0
℘ doz ... $15 00 $21 00

Saw Rods.
... dis 10 %

Saws.
Spear & Jackson's ... $4 50 to £ gold
John Spear ... $3 60 to £ gold
Am. Saw Co ... new list
Perforated Cross Cuts, all kinds ... 68c ℘ foot
Inserted Tooth ... dis 10 %
All else ... dis 12½ %
Disston's ... dis 12½ %
H. W. Peace's Circulars ... dis 10 %
Other kinds ... dis 10 %
Wm. McNiece's Hand, Cross Cut and Circular ... new list dis 16 %
E. M. Boynton's Lightning ... dis 30 %
" " Others ... dis 10 %

Scales.
Brown's ... dis 25&5 %
Fairbanks' ... new list dis 15 @ 20 %
Howe's ... dis 15&5 %
Shattuck's Counter and Union ... dis 15 %
National Platform ... dis 25 %
Eureka ... dis 25 %
Scale Beams ... dis 20 %
No. 1 800 to 1200 lbs ... 90c ℘ cwt
No. 2 " " ... 75c ℘ cwt

Screws.
American list of April 1, 1873.
Flat Head Iron ... dis 47½ %
Round Head Iron ... dis 40 %
Flat Head Brass ... dis 60 %
Round Head Brass ... dis 50 %
Round Head Silver Capped ... new list dis 20 %
Hand Rail ... dis 10 %
Coach or Lag ... dis 25 %
Coach, Patent Gimlet Point ... dis 5 %
Bed ... list net

Scythes.
Blood's German Steel, Grass ... ℘ doz $9 00
" Cast " " ... ℘ doz 10 00
" Silver " " ... ℘ doz 11 00
" German " Grain ... ℘ doz 13 00
" Cast " " ... ℘ doz 14 00
" Red Rover ... 12 00
" Young America ... 9 50
" Silver Clipper ... 12 63
Scythe Snaths ... dis 30 %

Shears.
Cast Steel ... dis 60&10 %
Conn. Cutlery Co., new brand ... dis 60 %
Rowe's ... dis 50&10 %

Shovels and Spades.
Ames ... new list dis 10 %
Rowland ... new list Feb. 8, '73, dis 20 %
Old Colony ... dis 2½ %

Shovels and Tongs.
Iron Head ... list net
Brass Head ... dis 5 %
Polished Steel ... new list dis 15 %

Slates.
Square Frames, Round Cornered, by case ... dis 60&10 %
Less than a case ... dis 50 @ 55 %
Oval Frames, by case ... dis 40 @ 40&10 %
Less than a case ... dis 30 %

Spoons.
Iron ... new advanced list, dis 10 %
By the case ... dis 20 %
Britannia ... dis 40 %
Plated A 1 ... revised list dis 30&5 %
German Silver ... revised list dis 15&5 %
Tinned (P. S. & W.)—
Teas ... $1·60 ℘ gross, net
Tables ... 2·75 " net

Stocks and Dies.
... dis 15 %

Stove Polish.
Gem ... ℘ gross $5 00, dis 10 %
Joseph Dixon's ... ℘ gross, $6 00 @ 6 25
National ... ℘ gross $4 75
Gold Medal ... ℘ gross $6 00, dis 15 %

Squares.
Steel ... dis 50 %; full cases, dis 50&10 %
Iron ... dis 50 %; full cases, dis 50&10 %
Nickel Plated ... add $2 50 @ $4 00 ℘ doz net
Try Squares and T Bevels ... dis 45&10 %
Star Try Squares and Bevels ... dis 30 %

Tacks.
Full Weight American Iron ... dis 35&7½ %
Half Weight American Iron ... dis 67½&7½ %
Carpet ... dis 7½ %
Brads American Half Weight ... dis 50&7½ %
Finishing Nails ... ⅜ ½ ¾ 1 1¼ in. and over
℘ ℔ ... 25c 20c 15c 14c 13c dis 7½ %
Trunk and Clout ... ⅜ ½ ¾ 1 1¼ in. and over
℘ ℔ ... 25c 20c 15c 14c 13c dis 7½ %
Copper Tacks ... ℘ ℔ 56c—dis 7½ %
Iron Shoe Nails, ℘ ℔ 4-8 and longer, 10½c; 3½-8, 11c ... dis 7½ %
Double Pointed ... new list dis 33⅓ %

Tapes, Measuring.
American Flask and Cap Co ... dis 10&10 %
Eddy's ... dis 10&10 %

Toe Calks.
... ℘ ℔ 13c net

Tobacco Cutters.
Champion ... dis 20 %
Peck, Stow & Wilcox ... dis 10 %

Tinners' Tools and Machines.
P. S. & W ... list net

Traps.
Newhouse ... dis 20 %
Hotchkiss ... dis 20 %
Peck, Stow & Wilcox ... dis 30 %
Blake's Patent ... dis 15 @ 20 %

Vises.
Trenton Vises, Solid Box.
30 to 110 lbs ... 17c
111 to 160 lbs ... 18c
160 and over ... 21½c
Peter Wright's ... ℘ ℔ 15½c. gold
Wilson's Solid Box ... dis 10 @ 15 %
30 to 160 lbs ... 18c
160 and upward ... 21c
Backus & Union, Parallel ... dis 25 %
Buffalo, Parallel ... new list dis 15 %
Fisher & Norris' Double Screw Parallel ... dis 15 @ 15&5 %

Wire.
Bright and Annealed ... Nos 0 @ 18 dis 30 @ 35 %
" " ... " 19 @ 26 dis 40 @ 45 %
" " ... " 27 @ 36 dis 45 @ 50 %
Coppered ... Nos. 0 @ 18 dis 22½ @ 27½ %
Galvanized, Nos. 0 to 12 ... dis 35 @ 40 %
Galvanized, Nos. 13 to 18 ... dis 40 @ 45
Tinned ... dis 15 @ 20 %
Cast Steel ... 5 @ 10 %
Tinned Broom Wire ... dis 20 @ 25 %
Galvanized Telegraph, Nos. 8 and 9 ... ℘ ℔ 10c @ 11c
" " " 10 and 11 ... ℘ ℔ 11c @ 12c
" " " 12 ... ℘ ℔ 11½c @ 12½c
Annealed Fence, Nos. 8 and 9 ... dis 30 @ 35 %
" Grape, " 10 to 14 ... dis 30 @ 35 %
Fence Staples ... ℘ ℔ 9 @ 9½ %
Stubs' Steel Wire ... $7 00 to ℔ gold

Wrenches.
American Adjustable ... dis 45 %
Baxter's Adjustable "S" ... dis 20 %
" Diagonal ... dis 20 %
Collins & Co.'s ... new dis list 30 %
Coes Genuine ... dis 40 %
" Pattern (Wrought) ... dis 50 %
" " (Malleable) ... dis 50&10 %
Lindsay's Patent ... dis 25 %
Taft's Pattern ... dis 65&10 %
Davis' Patent Duplex ... new list dis 25 %

TIN WARE.

STAMPED TIN WARE.

Basins.
Wash Basins, Handled, Plain Stamped ... dis 20 %
Inch ... 10 11 11½
Per doz ... $3·50 4·00 4·50
Wash Basins, Handled, Retinned ... dis 25 %
Inch ... 10 11 11½
Per doz ... $4·00 4·50 5·00
Wash Basins, with Feet, Plain Stamped ... dis 20 %
Inch ... 10 11 11½ 13½
Per doz ... $2·00 2·50 2·85 3·75
Wash Basins, with Feet, Retinned ... dis 25 %
Inch ... 10 11 11½ 13½
Per doz ... $3·00 3·50 4·00 5·00
Wash Basins, Stamped ... dis 20 %
Inch ... 10 10½ 11½
Per doz ... $1·70 2·10 2·50
Inch Shallow ... 10 11
Per doz ... $1·55 1·90
Wash Basins, Retinned ... dis 25 %
Inch ... 10 10½ 11½
Per doz ... $2·50 3·00 3·50
Inch Shallow ... 10 11
Per doz ... $2·00 2·60

Covers.
Bucket ... net

	1 pt.	1 qt.	2	3	4	6	10	12 qt.
Per gross	$1·75	2·15	3·20	3·60	4·40	5·50	7·00	10·75

Coffee Pot ... net

	3 pt.	2 qt.	3	4	6 qt.
Per gross	$ ·95	1·10	1·40	1·80	2·25

Pot ... net

Inch	7½	7¾	8¼	8¾	9¼	9¾	10½
Per gross	$4·10	4·50	5·15	5·65	6·25	6·00	8·25
Inch	10¾	11¼	11¾	12¼	12¾	13½	
Per gross	$8·85	9·60	10·20	12·25	13·50	15·00	

Tea Kettle Breasts and Covers ... net

Inch	6	6½	7	7½	8	8½	9
Per gross	$5·00	5·25	5·60	6·15	6·75	7·50	8·30
Inch	9½	10	10½	11	11½	12	13
Per gross	$8·65	11·50	12·00	12·25	13·00	17·00	18·00

Stove Pipe Collars, Tin ... net

Inch	4	4½	5	5½	6	7
Per gross	$3·40	3·65	4·40	4·80	5·35	6·35

Dipper Bowls, Plain Stamped ... dis 25 %
Pints ... ½ ¾ 1 1½ Quarts ... 1 2 2½
Per doz. ·50 ·60 ·70 ·80 Per doz ... ·90 1·25 1·50
Dipper Bowls, Retinned ... dis 25 %
Pints ... ½ ¾ 1 1½ Quarts ... 1 2 2½
Per doz. ·75 ·95 1·00 1·15 Per doz ... 1·30 1·55 1·90

Pans.
Dish Pans, Tinned ... dis 30 %

Quarts	7	8	10	14	17	21	30
Per doz	8·50	9·50	11·00	13·00	16·00	19·00	30·00

Milk Pans, Plain Stamped ... dis 20 %

Quarts	½	1	1½	2	3	4	5	6	8	10
Per doz	$ ·85	1·05	1·20	1·45	1·65	2·40	2·90	3·15	4·40	5·00

Milk Pans, Retinned ... dis 25 %

Quarts	½	1	1½	2	3	4	5	6	8	10
Per doz	$1·15	1·40	1·60	1·90	2·15	3·00	3·40	3·80	5·20	6·00

Pie Plates, Deep ... net

Inch	6	7	8	9	10	11	9	10
Per gross	$3·40	4·25	5·30	6·00	8·50	10·00	7·25	9·25

JAPANNED TIN WARE.

Cannisters, Common ... net
Pound ... ½ 1 2 3
Per doz ... $ ·75 1·20 1·70 2·20
Cannisters, Hinged ... net
Pound ... 1 1½ 2 3 4 6
Per doz ... $1·25 1·75 2·20 2·60 3·00 3·50
Candlesticks, Japanned ... net
No ... 1 2
Per gross ... $6·00 5·50
Cake Boxes, Round ... net, per nest, $2·40
" Square ... net, per nest, 3·40
Dust Pans, Corrugated ... net, per gross, $18·00
Grates, Box ... net, per gross $3·20
Molasses Cups ... net
Pint ... ½ 1 2
Per gross ... $10·40 12·80 24·00
Pepper Boxes Japanned ... net
Per gross ... Small, $2·50; Large, $3·20
Toy Banks, House ... net
No ... 1 2
Per gross ... $6·00 4·25
Toy Banks, Gothic ... net
No ... 1 2
Per gross ... $5·25 3·25
Toy Cups, Straight ... net
No ... 1 2 3
Per gross ... $3·40 2·80 2·40
Toy Cups, Flaring ... net
No ... 1 2
Per gross ... $3·60 3·20
Toy Pails, Covered ... net
No ... 1 2
Per gross ... $3·25 2·85
Toy Rattles ... net, per gross, $1·75
Trunks, Wire Handled ... net, per nest (3) $1·25
Spittoons, Tin ... net, per gross $22·00

PLANISHED TIN WARE.

Planished Coffee Pots, Round ... dis 20 %

Each	·60	·75	·85	·95	1·15	1·25	1·30	1·40
Pints	1	2	3	4	5	6	7	8

Planished Tea Pots, Round ... dis 20 %

Each	·70	·80	·95	1·05	1·25
Pints	2	3	4	5	6

Planished Tea Pots, Oval ... dis 20 %

Each	·70	·80	·90	1·05	1·15	1·30	1·75
Pints	1	2	3	4	5	6	8

METALS.

IRON.—Duty: Bars, 1 to 1½ cents per lb., Sheet, Band, Hoop and Scroll, 1½ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. All subject to a reduction of 10 per cent. Railroad, 70 cents per 100 lbs. Boiler and Plate, 1½ cents per lb.

Pig Iron—AMERICAN.
Foundry No. 1 ... ℘ ton, $33 00 @ 35 00
Foundry No. 2 ... " 28 00 @ 30 00
Gray Forge ... " 24 00 @ 25 00
White and Mottled ... "

SCOTCH.
Gartsherrie ... " 43 00 @
Coltness ... " 43 00 @ 45 00
Glengarnock ... " 38 00 @ 40 00
Eglinton ... " 39 00

Bar Iron.
Am. Refined, at mill ... ℘ ℔ 3·3

Rails.
Welsh, gold ... ℘ ton, 60 00 @
American, at works, currency ... " 65 00 @ 68 00
Old Rails, currency ... " 35 00 @ 36 00

Scrap.
Wrought Scrap, from yard ... " 35 00

Bar Iron from Store.
Common Iron.
⅜ to 2 in. round and square ... ℘ ton, $ 72 50
⅝x9-16 in " " ... " 77 50
⅜ in. " " ... " 80 00
2¼ to 3 in. " ... " 77 50
1 to 6 in. wide x ⅜ and 1 in. thick ... " 72 50
1¼ to 6 in wide x ¼ & 5-16 in. thick ... " 77 50
1 and 1½ in. x ¼ and 5-16 ... " 85 00
Swedish Iron.
1½x⅜ and ½ ... " 180 00
1½x⅝ to ⅜, and ⅝ square ... " 175 00
1¾ to 5x⅝ to ⅜ and ⅜ to 2-in. square ... " 170 00
6 to 8x⅜ and ½ ... " 190 00
Refined Iron.
⅜ to 2 in. round and square ... " 77 50
1 to 6 in. wide x ⅜ to 1 thick ... " 77 50
1½ to 6 in wide x ¼ and 5-16 thick ... " 82 50
1 and 1½ x ¼ and 5-16 ... " 82 50
Large Rounds.
2¼ to 2¾, round and square ... " 82 50
3, 3¼ and 3½ in ... " 90 00
3¾ and 4 in ... " 100 00
Rods—⅝ and 11-16, round and square ... " 82 50
½ and 9-16, " " ... " 87 50
7-16, " " ... " 90 00
⅜, " " ... " 95 00
5-16, " " ... " 100 00
¼, " " ... " 105 00
3-16, " " ... " 130 00
Band Iron.
1 to 6 in. x 3-16 to No. 12 ... " 100 00
Horse Shoe Iron.
⅜ and ⅝ x ⅜, to ½ ... " } 117 50
1 x ⅜, to ⅝ ... " }
Ovals, Half Ovals and Half Rounds.
⅜ to 1½ ... ℘ ton, $105 00
⅝ and 11-16 ... " 110 00
½ and 9-16 ... " 115 00
7-16 ... "
⅜ ... "
Nail Rods
Best Norway ... ℘ ℔ 9c
Norway Shapes
⅜ to 2 in. x ⅜ to ⅝ ... " } 8½c
⅜ to ⅜ square ... " }
Norway Bar
⅜ to 2 in. square ...
Spring Steel
1 to 4 in. wide ... " 8c
Tire Steel
⅜ to 1½ x ¼ and 5-16 ... " 8½c
⅜ & 1 x 3-16 ... " } 9½c
⅜ & 1 x ⅜ ... " }
Toe Calk Steel
⅜ to ⅜ x ⅜ to ½ ... " 8c
Plow Steel
6 to 16 wide ... " 9½c
Sleigh Shoe Steel
⅜ to 1½ x ⅜ to ⅝ ... 6½c
Hoops, ⅝ x No. 22 ... ℘ ton, $155 00
" ¾ x No. 20 ... " 135 00
" ⅞ x No. 19 ... " 130 00
" 1 and 1½ x No. 18 ... " 120 00
" 1¾ to 2 and 1x1½ x No. 13 and 14 ... " 110 00
Scroll Iron—½ x 12 ... " 132 50
" ½ x 10 ... " 122 50
" ½ x 3-16 ... " 127 50
" ½ x ¼ ... " 122 50
" ⅝ x 14 ... " 132 50
" ⅝ x 12 ... " 120 00
" ⅝ x 10 ... " 117 50
" ⅝ x 3-16 ... " 115 00
" ⅝ x ¼ ... " 112 50
" ¾ x 12 ... " 115 00
" ¾ x 10 ... " 112 50
" ¾ x 3-16 ... " 110 00
" ¾ x ¼ ... " 107 50
" ⅞ x 14 ... "
" ⅞ x 12 ... " 110 00
" ⅞ x 10 ... " 107 50
" ⅞ x 3-16 ... " 106 00
" ⅞ x ¼ ... " 102 50
" ¾ x 14 ... " 120 00

Sheet Iron.

		Common English.	R. G. American.
Nos. 10 to 20	℘ ℔	5½c	6½c
21 to 24	"	5¾c	6¾c
25 to 26	"	6c	7c
27	"	6½c	7½c
28	"	6¾c	7½c
30	"	7½c	

Galvanized, 10 to 20, prime ... ℘ ℔ 11c
" 21 to 24 ... " 12c
" 25 to 26 ... " 13c
" 27 ... " 14c
Patent Polished ... " 15c
Russia, Nos. 8 to 11 ... ℘ ℔ 20c
" Nos. 12 to 16 ... " 20c
" Stained, No. 1 ... " 18½c
Belgian ... "

One piece Corrugated Sheet Iron Elbows.

CHARCOAL IRON.

4½	5	5½	6	7 inch.
$3·75	4·25	5·25	5·25	6·50 per doz.

RUSSIA IRON.

4½	5	5½	6	7 inch.
$8·00	10·00	13·00	13·00	14·00 per doz.

Adjustable Stove Pipe Elbows.

CHARCOAL IRON.

4	4½	5	5½	6	7 inch.
$3·25	3·75	4·25	4·75	5·25	6·25 per doz.

RUSSIA IRON.

4	4¼	5	5¼	6	7 inch.
$7·00	8·00	9·50	10·75	11·75	13·75 per doz.

Discount on orders of 10 doz. 5 %.
" " " " 25 doz. 10 %.

COPPER—DUTY: Pig, Bar and Ingot, 5c.; old copper, 4 cents ₩ lb; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem. All subject to a reduction of 10 per cent.

American Ingot.....₩ lb 26 @ 26¼c
English " ..... "

SHEATHING, BRAZIERS COPPER, BOLTS, &C.

Braziers Copper, ordinary sizes, over 16 oz., per square foot.....40c ₩ lb
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot.....43c. "
Braziers'Copper, 12 oz.per square foot and lighter.46c. "
Circles less than 24 inch in diameter.....43c. "
Circles, 24 inch diameter and over.....46c. "
Segment and Pattern Sheets.....43c. "
Locomotive Fire Box Sheets.....40c. "
Sheathing Copper, over 12 oz. per sq. ft.....38c. "
" " 12 oz. ₩ sq. ft. and lighter... 46c. "
Bolt Copper.....40c. "

No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the square foot.

TINNING.

14x48, by the case.....8c. ₩ sheet
14x48, less than case.....10c. "
Boiler Sizes, 7 and 8 inch.....12c. "
" 9 inch.....15c. "
Other sizes not larger than 30x60.....2½c. ₩ sq.
Larger than 30x60.....5c. "
Copper Bottoms, 36c. ₩ lb.....net

O'NEILL'S PATENT PLANISHED COPPER.

14x48.

14 and 16 oz. and heavier.....44c. By the case, 43c. ₩ lb
12 oz. and lighter.....47c. " " 45c. "

Boiler Sizes.

7 in., 14x52. 8 in., 4x56. 9 in., 14x10

14 and 16 oz. and heavier.....46c. By the case, 45c. ₩ lb
(And all sizes not over 20 inches wide.)

50x60

14 and 16 oz. and heavier.....48c. ₩ lb
12 oz.....51c. "

LEAD—DUTY: Pig, $2 per 100 lbs.; old Lead, 1½ cent per lb.; Pipe and Sheet, 2½ cents per lb. All subject to a reduction of 10 per cent.

Spanish.....6¾ @ 6¾c gold
German Refined.....6¾ @ 6¾c gold
English.....@ 7¾c gold
Bar.....dis 10 %.....9¼c.
Pipe.....dis 10 %.....10½c.
Tin Lined Pipe.....dis 10 %.....16½c.
Sheet.....dis 10 %.....10½c.
Shot.....dis 10 %.Drop, 11½c.; Buck, 12½c.
Solder No. 1, 20c. @ 21c. No. 2, 19c. @ 20c.

STEEL—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents; over 7 cents, and not above 11, 3 cents per lb.; over 11, 3½ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. All subject to a reduction of 10 per cent. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as Steel.

American Cast Steel.

Tool.....17c
Spring.....13½c
Homogeneous.....13½c
Tire.....12½ @ 13½c
Machinery (round and square).....11½ @ 12c
File.....12½c
Sheet.....14 @ 16c
Saw Plate, mill and mulay.....14 @ 16½c
Saw Plate, gang and X cut.....13 @ 14c
" circular as to size.....18 @ 30c

Chrome Steel.

Tool.....₩ lb 20 @ 21c
Tool, extra fine.....40 @ 75c
Spring.....₩ lb 12c and upward
Machinery.....₩ lb 14c.
Hammer.....15c,
Gun or Homogeneous.....16c.

English Steel.—payable in gold, dis 5 % cash.

" Best Cast.....₩ lb 19½c
" Extra Cast.....20½c
" Round Machinery, Cast.....12½c
" Swaged, Cast.....21½c
" Best Double Shear.....19½c
" Blister, 1st quality.....15½c
" " 2d quality.....13½c
" " 3d quality.....11½c
German Steel, Best.....12½c
do Eagle.....11½c
do 3d quality.....10½c
Sheet Cast Steel, 1st quality.....19½c
" " 2d quality.....17½c

SPELTER—DUTY: In Pigs, Bars and Plates, $1 50 per 100 lbs.—less 10 per cent.

Silesian, cash.....7¼ @ 7¾c., gold
American " .....8 @ 11c., currency

TIN—DUTY: Plates, Sheets, Tagger and Terne, 15 per cent. ad val.; Electro-galvanized Plates, 2 cents per lb. Manufactures of, not enumerated, 35 per cent. ad val. —all subject to a reduction of 10 per cent. Bars, Banca or Block, and Pigs, free.

Banca.....₩ lb 34c., gold
Straits.....₩ lb 30c., gold
English.....₩ lb 28c., gold

CHARCOAL TIN PLATE.

I C 10x14, Prime Charcoal		11·75
12x12,	"	12·25
14x20,	"	12·50
I X 10x14,	"	14·00
12x12,	"	14·50
14x20,	"	15·00
For each additional X add.		2·25

COKE TIN PLATE.

	Best.	2d Quality.	Ordinary
I C 10x14	$11·25	$10·00	9·00 @ $10·00
I C 12x12	11·75	10·50	
I C 14x20	11·75	10·50	

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$10·75	10·25 @ 10·50	8·00 @ 10·00
I X 14x20	13·00		

ZINC.—DUTY: Pig or Block, $1 50 per 100 lbs. Sheet, 2½c. ₩ lb. All subject to a reduction of 10 per cent.

Sheet.....cask 9½c
" .....open 10c

Paper Stock, Old Metals, &c.

(Dealers' Selling Prices.)

Canvas linen	6 @
" cotton, No. 1	6¾ @ 7
" " No. 2	4
White linen rags, No. 1	6½ @
" " No. 2	4¾ @ 5
Colored	2½ @
Mixed woolens	2 @ 3
Soft woolens	6 @
Gunny bagging	1½ @ 1¾
Jute Butts	1¾ @ 1¾
Kentucky bagging	3½ @ 3¾
Book stock	4 @ 4½
Waste paper and scraps	1½ @ 3
Rope cuttings	1½ @ 3
Kentucky Bale rope	4 @ 4¼
Oakum junk, No. 1	5 @ 5½
" No. 2	3½ @ 4
Grass rope	3½ @ 3¾
Tarred Shaking	1½ @ 1¾

Old Metal.

Copper	21 @ 23
Yellow metal	15 @ 16
Brass	17 @ 18
Heavy Composition	21 @ 23
Old lead, solid	5½ @ 6
Tea lead	5¼
Wrought iron	1½ @ 1¾
Sheet iron	0¾ @
Cast iron	1 @ 1¼
Machinery iron	1¼ @ 1¾
Zinc	6
Pewter, No. 1	23 @ 25
" No. 2	10 @ 12
Spelter	7

Paints, Oils, etc.

Paints.

Black, lamp—Coach Painters.....₩ lb 20c
" " Ordinary.....6c
" Ivory Drop, fair.....15c
" " best.....26c
Black Paint, in oil.....kegs, 8c.; asst'd cans, 11 c
Blue, Prussian, fair to best.....50 @ 75c
" " in oil.....35 @ 65c
" Chinese, dry.....8c
" Ultamarine.....25 @ 3.c
Brown, Spanish.....1½c
" Van Dyke.....9c
Carmine, 40.....$12 00
Green, Chrome.....15 @ 23c
" in oil.....18 @ 25c
" Paris.....good, 30c; best, 40c
" " in oil.....30c; " 45c
Mineral Paints.....1¼ @ 4c
Orange Mineral.....14½c
Red Lead, American.....9¾c
" English.....10½c
" Venetian (N. C.) dry.....2¾c
" in oil.....asst'd cans, 11c; kegs, 8½c
" Indian, dry.....10c
Rose Pink.....13c
Sienna ,American, Raw.....4c
" Burnt.....4½c
" " in oil.....16 @ 20c
" Raw " .....15 @ 25c
Umber, Burnt.....4 @ 8c
" " in oil.....16 @ 21c
" Raw.....3½ @ 7½c
" " in oil.....16 @ 22c
Vermillion, Chinese.....$1 55
" English.....1 48
" Trieste.....1 38
" American, Common.....23c
White Lead, American, pure dry.....11 c
" " in oil.....11½c
White, Paris, English, prime.....in bbls. 2¾ @ 3¼c
Yellow Ochre French.....2½ @ 2¾c
" " in oil.....asst'd cans, 11c; kegs, 8½c
" Vermont.....in casks 1½c
" Chrome.....17 @ 21c
" in oil.....18 @ 23c
Zinc White, American No. 1 dry.....9c
" " in oil.....11c
" French (Paris).....11 c
" " in oil.....12 c

Oils.

Linseed Raw.....₩ gal. casks, 89c, bbls. 9 c.
" Boiled....." 94c. " 98c.
Whale, Crude.....
" Bleached Winter.....
Sperm, Crude.....
" Winter unbleached.....
" Bleached.....
Seal, Extra Refined.....
Lard, Pure Winter.....
" Spring.....
Cotton Seed, Crude.....
" Southern Yellow.....
" White.....
Neatsfoot, Winter.....$1·10 @ $1·35
Natural Lubricating.....bbls, 45c

Sundries.

Asphaltum.....9c
Benzine.....₩ gal. 16c
Chalk.....1¼c
" Block.....
Dryer, patent, Am'n.....ass't cans, 10·5c.; kegs, 9c
" " English.....11c.; " 9c
Flocks.....
Frostings.....50c
Glue, White.....38 @ 47c
" Sheet.....20c
Glaziers' Points, Zinc.....9c
Gum, Copal.....38c
" Damar.....25c
" Shellac, English.....66c
" " dark.....46c
Litharge.....10c
Pumice Stone, selected Lumps.....4 @ 6c
" powdered.....4c
Putty in bladders.....3½c
" in bulk.....3c
Rotton Stone, soft, English.....5c
Spirits Turpentine.....41c
Whiting, Spanish.....1¼c

Glass.

French Window—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.

SINGLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 7 x 9	$8·00	$7·00	$6·75	$6·00
8 x 10 to 10 x 14	8·50	8·00	7·25	6·50
10 x 15 to 12 x 16	9·00	8·50	8·00	6·75
12 x 16 to 16 x 20	9·50	9·00	8·50	7·75
15 x 22 to 15 x 30	11·75	10·50	10·00	8·00
16 x 30 to 22 x 30	14·25	12·25	11·00	9·50
15 x 38 to 22 x 36	15·00	13·50	12·00	
24 x 36 to 24 x 40	15·75	14·25	12·50	
28 x 38 to 28 x 42	16·25	14·75	13·25	
28 x 44 to 28 x 50	17·25	15·75	14·25	
30 x 50 to 30 x 54	20·50	17·00	15·50	
32 x 54 to 34 x 56	21·50	19·25	17·50	
34 x 58 to 34 x 60	23·00	21·50	20·25	
36 x 60 to 40 x 60	26·50	24·25	23·00	

DOUBLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 7 x 9	$13·00	$12·00	$11·50	$10·00
8 x 10 to 10 x 14	14·00	12·75	12·00	10·75
10 x 15 to 12 x 16	15·00	14·00	13·25	11·25
13 x 16 to 16 x 20	16·00	15·00	14·00	12·50
15 x 22 to 15 x 30	20·00	17·50	16·50	13·25
16 x 30 to 22 x 30	22·00	19·25	17·75	15·00
15 x 38 to 22 x 36	23·75	20·50	19·25	
24 x 36 to 24 x 40	24·75	22·50	20·00	
28 x 38 to 28 x 42	26·00	23·50	21·00	
28 x 44 to 28 x 50	27·50	25·50	22·50	
30 x 50 to 30 x 54	31·00	26·50	24·00	
32 x 54 to 34 x 56	32·50	29·00	26·50	
34 x 58 to 34 x 60	34·50	33·00	31·00	
36 x 60 to 40 x 60	39·50	36·50	35·00	

Sizes above—$12·00 per box extra for every 5 inches. Discount to the trade, 50&10 per cent.
An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches, will be charged in the 84 united inches bracket.

The Iron Age Directory

and Index to Advertisements.

Hardware.

ROY & COMPANY,

West Troy, N. Y.,

Manufacturers of

Wrought Iron Butts, Strap and T Hinges,

PLATE AND HOOK HINGES,

Cold Pressed Nuts and Washers, Felloe Clips, &c.

JOHN L. FISHER, Agent, 116 Duane Street, New York.

SPEAR & JACKSON,

Sheffield, England,

MANUFACTURERS OF

Saws, Files, Edge Tools and Steel.

JOHN L. FISHER. Agent,

116 Duane Street, NEW YORK.

STANLEY WORKS,

MANUFACTURERS OF

Wrought Butts, Strap and T Hinges.

Bronzed Butts and Bolts.

Wrought Barrel, Square and Shutter Bolts.

Wrought Chest Handles, Washers, Flush Bolts, &c

79 CHAMBERS ST., NEW YORK.

Factory at New Britain, CONNECTICUT.

HILGER & SONS,

87 Chambers and 69 Reade Streets, NEW YORK

MANUFACTURERS AND IMPORTERS OF

German Hardware, Cutlery, Scissors, Coffin Lace, Sheep Shears

Ball Braces, Bright Halter and Coil Chains, &c.

Also, Birmingham and Sheffield Hardware and Chains, Butcher's Files, Edge Tools & Razors, Wostenholm's Razors & Farriers' Knives, John Wilson's Butcher Knives and Steels, Stub's Tapers, Chesterman's Metallic Tapes, Isaac Greave's Hedge Shears, James Bees & Parkin's Spoke Shaves, Turn Screws and Braces, Pad Locks, Goulcher's Gun Locks, Brades Trowels, &c.

HERMANN BOKER & CO.,

OFFICES AND WAREHOUSES:

NEW YORK, 101 and 103 Duane and 91 and 93 Thomas Streets.

REMSCHEID and SOLINGEN (Prussia.) H. BOKER & CO.

SHEFFIELD (England), No. 3 Arundal Lane, Represented by Mr. ARTHUR LEE.

LIEGE (Belgium), Represented by Mr. LOUIS MULLER.

Manufacturers and Importers of **Cutlery, Guns, Hardware** and **Railroad Material.**

Proprietors of **TRENTON VISE AND TOOL WORKS, Trenton, N. J.**—Vises, Picks, Mattocks, Grub Hoes, Sledges, Hammers, Bridge Work, Turn Tables, etc.

Proprietors of the **MANHATTAN CUTLERY CO.,** "O. K." Razors.

Sole Agents for **LAMSON & GOODNOW MFG. CO., Shelburne Falls, Mass.**—Table Cutlery and Butcher Knives.

W. & S. Butcher's Files, Edge Tools and Razors, the largest stock in the United States.

Geo. Wostenholm & Son's Knives, Scissors and Razors, the largest stock in the U. S.

John Wilson's Butcher and Shoe Knives.

Peter Wright's and Armitage Anvils.

We always have on hand a full assortment of

German and English Hardware, Cutlery, Guns, Gun Material, Chains, Heavy Goods.

JOHN WILSON'S CELEBRATED

BUTCHERS' KNIVES,

BUTCHERS' STEELS,

AND

SHOE KNIVES.

CORPORATE TRADE MARK. FOUR PEPPERCORNS AND A HAMMER.

THE TRADE MARK, IN ADDITION TO THE NAME, IS STAMPED UPON EVERY ARTICLE MANUFACTURED BY

JOHN WILSON.

GRANTED A.D. 1766, BY THE CORPORATION OF CUTLERS OF SHEFFIELD, AND PROTECTED BY ACT OF PARLIAMENT.

BUYERS ARE SPECIALLY CAUTIONED AGAINST IMITATIONS OF THE MARK, AND THE SUBSTITUTION OF COUNTERFEITS BEARING THE NAME, "WILSON," ONLY.

Works:—SYCAMORE STREET, SHEFFIELD. ESTABLISHED in the Year 1750.

BEAM & MURRAY,

IMPORTERS OF

Anvils, Chains, Pocket Cutlery, Guns, Files,

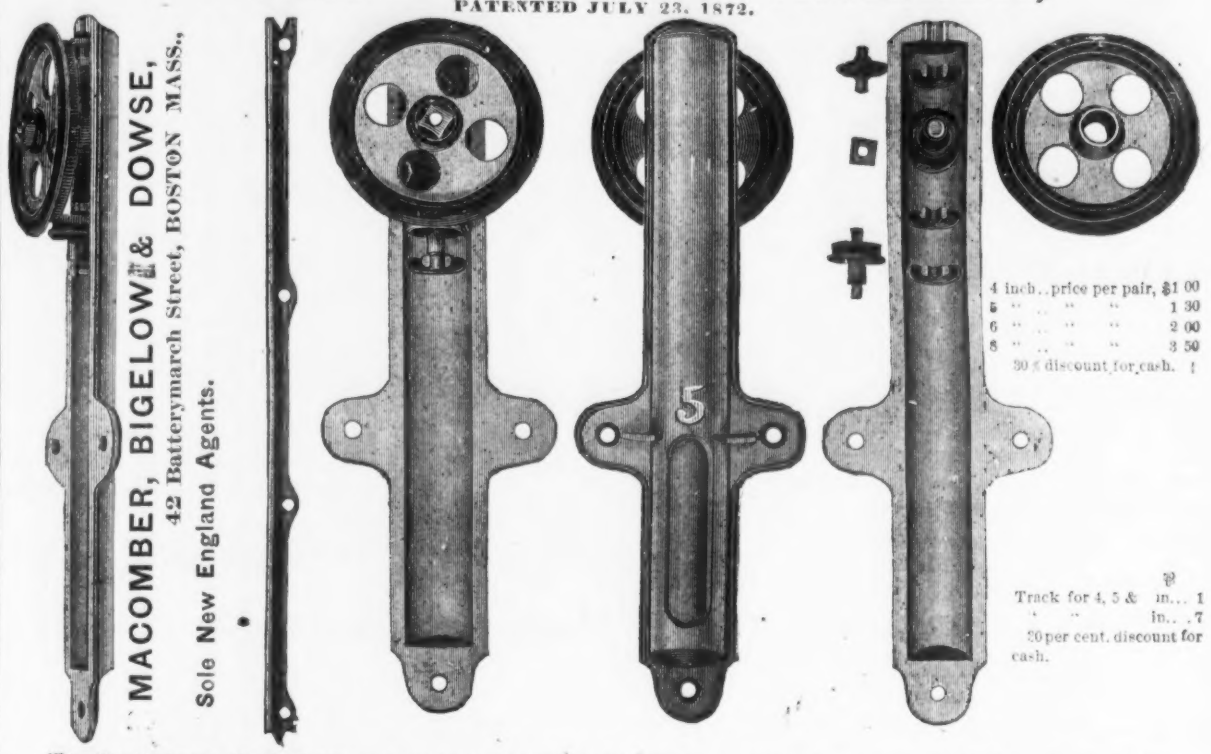
BIRMINGHAM, SHEFFIELD & GERMAN HARDWARE,

Wostenholm's IXL Pocket Knives & Razors, Butcher's Files, Tools, &c.

No. 54 Cliff Street. NEW YORK.

PATENT NOVELTY HANGER,

PATENTED JULY 23, 1872.



MACOMBER, BIGELOW & DOWSE, 42 Batterymarch Street, BOSTON MASS., Sole New England Agents.

4 inch.. price per pair, $1 00
5 " .. " " 1 30
6 " .. " " 2 00
8 " .. " " 3 50
30 ℅ discount for cash.

Track for 4, 5 & ⅝ in... 1
" " in... .7
20 per cent. discount for cash.

We, without hesitation, offer this Hanger as the best article in the market for the purpose. Its many advantages over all other Hangers are as follows:

1st.—It is more than **double as strong** as any other Hanger, owing to its semi-cylindrical or curved back.

2nd.—It is provided with a friction wheel at the top of the Case, which bears against the rear or outside of the sheaves, and prevents it from **leaning outward** and causing it to **RUN TRUE,** a feature not attained in any other Hanger.

3d.—By thus causing the sheave to run true, the doors are always held up **Close to the Frame,** and maintain a close joint around it.

4th.—The sheave has but one flange, there being a lower friction wheel provided with a flange which extends out under the face of the sheave and bears against the outer side of the track, which takes the place of the extra flange in the sheave, thus doing away with the **grooved sheave** which always grinds or breaks

5th.—IT CAN NEVER RUN OFF THE TRACK.

6th.—It is the **easiest running** Hanger made, our 5 in. answering the same as 6 in. of the checkback and ordinary makes.

7th.—It is the Most Complete Hanger, in its construction, being tasty, as well as durable.

LOUDERBACK, GILBERT & CO., 53 Chambers Street, New York City.

Also Agents for the CONNECTICUT CUTLERY CO., of Naugatuck, Conn., and keep on hand a complete assortment of their goods

E. C. C. KELLOGG PATENT. Feb. 18, 1866.

COMBINATION BELT PUNCH,

Pronounced by those who have used them the handiest and most desirable tool in use of its kind. As will be seen, the combination consists of

☞ BELT PUNCH, KNIFE AND AWL,

Also, ☞ *Needle for Lacing Rubber Belting,* so combined that each tool does its specific work and not interfere with either of the others.

E. C. C. KELLOGG & CO., Hartford, Conn.

For Sale Wholesale and Retail by ÆTNA NUT COMPANY, 97 Chambers Street, New York.

CHARLES CHURCHILL & CO.,

American Merchants & Importers of Machinery & Tools,

28 Wilson Street, Finsbury, London, Eng.

New York House, W. CHURCHILL & CO., 493 Greenwich St., N. Y.

To AMERICAN MANUFACTURERS we offer our services for the introduction, in Great Britain and the Continent, of MACHINERY and TOOLS of improved construction. It is now seven years since we established ourselves in London, and during that time we have succeeded in establishing a demand which is now rapidly increasing, thus proving the value of these goods throughout Great Britain and the Continent. We are now the European Agents for several leading American Tool Makers, to whom we will give reference on application to either our London or New York house.

We invite all makers of Improved Machinery and Tools to communicate with us, sending us catalogues and price lists. We shall be pleased to take up and introduce all such goods suitable to this market. Having successfully introduced American Vises, Chucks, Drills, Drilling Machines, Pumps, and a variety of other tools and household utensils, we are confident all good and useful articles will meet with success.

We are European Agents for *The Iron Age,* to whom reference may be made.

AMERICAN MANUFACTURERS receiving orders from abroad can communicate with our New York house and execute the orders through us, thus avoiding all risks.

C. CHURCHILL & CO. also offer their services to all purchasers of Machinery and Tools in Great Britain and Europe who may require special goods, for which quotations will be given on application. A *Stock* of Tools and Machinery are kept in our London Warehouse for immediate delivery.

Catalogues and Price Lists sent post free on application

Vulcan Manufacturing Co.,

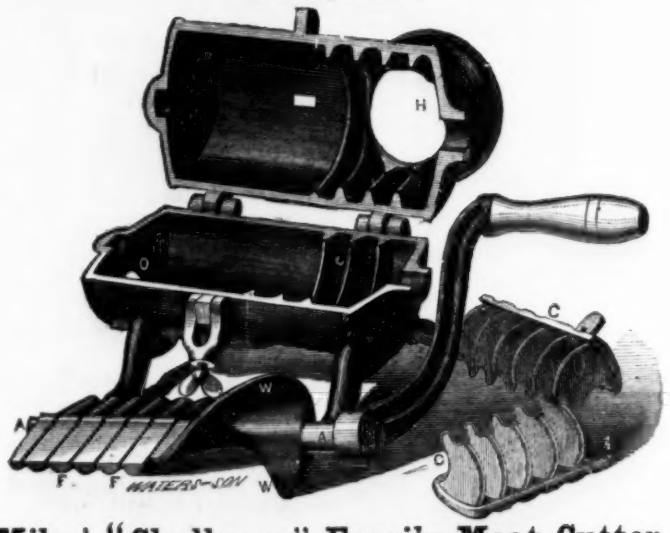
61 Warren Street, cor. College Place, New York.

MANUFACTURERS OF

MILES' FAMILY AND BUTCHERS' MEAT CUTTERS,

And Butchers' Machinery, Tools & Fixtures

of every kind.



Miles' "Challenge" Fami'y Meat Cutter.

This Machine has the following advantages over all other Cylinder Meat Cutters:

1st. **It is much more simple in its construction.** There are but three different parts inside of the machine, all of which can be readily taken out, separated, cleaned and replaced; consequently there is no place about the machine where meat or the juices of meat can get lodged and become rancid.

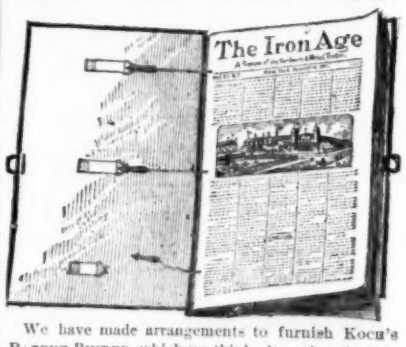
2d. The fingers on the arbor are so arranged that the knives shear close to them when the machine is in operation, thus **cutting the meat cleanly and evenly,** instead of tearing it apart like other Cylinder Meat Cutters.

3d. The knives are firmly held in their places—at one end by the block of iron into which they are cast, and at the other end by the grooves in the arbor, into which they fit; making it impossible for one to break while cutting meat.

4th. The ends of the knives thus entering into the grooves make bearing for the arbor, and prevent it from breaking or springing.

5th. The machine will cut more easily and more rapidly than any other Meat Cutter.

Get Binders FOR THE IRON AGE.



We have made arrangements to furnish KOCH'S PATENT BINDER, which we think altogether the best before the public, to our subscribers at the following very low rates—about the wholesale prices by the dozen.

Half Cloth.....$1·00 each.
(Cloth Back and Corners, with Morocco Paper Sides—a good, serviceable Binder.)

Full Cloth..... 1·50
(Morocco Cloth Back and Sides.)

Half Roan..... 1·75 "
(Roan Back; Cloth Sides.)

Half Morocco..... 2·00 "
(Morocco Back and Corners; Cloth Sides.)

The above are all in black, which is the most serviceable color, with the exception of the Half Morocco, which are put up in a number of handsome shades. The name of the paper is stamped in gold on either side, and each Binder is furnished with loops by which it can be hung up against the wall as newspaper files are usually disposed of.

The Binders will each hold the twenty-six numbers in the form of a bound volume. They can be nicely inserted in two or three minutes by any boy of ordinary intelligence; and when the covers are full they can be either preserved in that shape as bound volumes of *The Iron Age,* or they can be emptied and used again. There is no possibility of their getting out of order, unless the cords, which are very strong, wear out, when anyone can easily replace them with a piece of fishing line or other suitable string. Subscribers who value the paper should order them at once, so as to keep the paper in good order

On receipt of the price we will ship them, safely put up, by any express line or to any New York house to be packed. They are too large to be sent by mail.

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Now on exhibition at

AMERICAN INSTITUTE, NEW YORK.

UNIVERSALLY APPLICABLE TO

SHAFTING, MACHINERY

Of all kinds,

Elevators, Steam & City Passenger Cars, Iron & Steel Rolling Mills.

Warranted to Work under any pressure or speed, particularly without Wear, and without the use of any Lubricating Matter whatever.

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Or SAMUEL ECCLES, Jr.,
Baltimore, Md., Patentees.

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CONSULTING
Mining and Metallurgical
ENGINEERS,
Experts in Iron and Analytical Chemists
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George W. Maynard. Schuyler Van Rensselaer.

THOMAS M. DROWN,
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And Consulting Metallurgist,
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Henderson's Patent Iron.

The **"Purified Cast Iron"** costs but about $9 per ton more than common coke Pig Iron, and when mixed with one-half wrought iron makes good Cast Steel. The Wrought Iron from common coke Pig Iron makes Cast Steel equal to that made from the best Swedish Bar Iron.

The **"Common"** Bar Iron from common coke Pig Iron is stronger, softer and tougher than Low moor Iron.

The **"Common"** Boiler Plates from ordinary coke Pig Iron are stronger, 50 per cent. softer and 100 per cent. tougher than Lowmoor Iron.

For Licenses to make this iron apply to

JAMES HENDERSON,
30 Broadway, NEW YORK

The Iron-Masters' Laboratory.

Exclusively for the Analysis of Ores of Iron, ig and Manufactured Iron, Steels, Limestone, Clays, Slags & Coal for Practical Metallurgical Purposes.

No. 339 Walnut Street, Philadelphia.

J. BLODGET BRITTON.

This Laboratory was established in 1866, at the instance of a number of practical Iron-masters, expressly to afford prompt and reliable information upon the chemical com position of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

CHARGES TO IRON WORKS.

or determining the per cent. of pure Iron in an ordinary Ore	$4 00
For the per cent. of Pure Iron, Sulphur and Phosphorus in do	12 50
For each additional constituent of usual occurrence	1 50
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.	
or determining the per cent. of Sulphur and Phosphorus in Iron or Steel	12
or each additional constituent of usual occurrence	4 0
For the per cent. of Carbonate of Lime, and Insoluble Silicious Matter in a Limestone	10 00
or each additional constituent	2 00
For the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal	12 50

For determining the constituents of a Clay, Slag, Coke, or of an Ash of Coal the charges will correspond with those for the constituents of an ore.

For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.

Printed instructions for obtaining proper average samples for analysis furnished upon application.

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FRANCIS L. VINTON, E. M., Mining Engineer.
C. F. CHANDLER, Ph. D., Analytical and Applied Chemistry.
JOHN TORREY, M. D., LL. D., Botany.
CHARLES A. JOY, Ph. D., General Chemistry.
WILLIAM G. PECK, LL. D., Mechanics and Mining Surveying.
JOHN G. VAN AMRINGE, A. M. Mathematics.
OGDEN N. ROOD, A. M., Physics.
JOHN S. NEWBERRY, M. D., Geology and Palæontology.

The plan of this school embraces a three years' course for the degree of ENGINEER OF MINES, or BATCHELOR OF PHILOSOPHY.

For admission, candidates for a degree must pass an examination in Arithmetic, Algebra, Geometry and Plain Trigonometry. Persons not candidates for degrees are admitted without examination, and may pursue any or all of the subjects taught. The next session begins October 2nd. The examination for admission will be held on June 23rd and September 29th, 1871. For further information and catalogues, apply to

DR. C. F. CHANDLER,
Dean of the Faculty.

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97 Chambers and 81 Reade Streets, N. Y.

Hardware Manufacturer,

AND AGENT FOR

RHODE ISLAND HORSE SHOE CO.
L. COES & CO.'S GENUINE SCREW WRENCHES.
NEW LONDON HORSE NAIL CO.
WHEELER, MADDEN & CLEMSON.
WHEELER, CLEMSON & CO., FILES.
AMOSKEAG AXE CO.
TUTTLE MANUFACTUING CO.
EMPIRE MILLS TWINES.
FRENCH, SWIFT & CO.'S AUGERS & BITTS.
AUBURN TOOL CO.'S PLANES.
WINSTED HOE CO.'S PLANTERS HOES AND TOE CALKS.
WITHERBY TOOL CO.'S CHISELS, DRAWING KNIVES AND BORING MACHINES.
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OHIO BUTT COMPANY,

JOLIET, ILL.

MANUFACTURERS OF

CAST BUTT HINGES,

Drilled and Wire Jointed, Fast and Loose, Loose Pin Reversible, Plain, Japanned, and Japanned with Silver Acorns. Loose Joint Japanned, and the same with Japanned or Silver Acorns.

We have appointed

HORACE DURRIE,

No. 97 Chambers St., New York,

Our only Agent in NEW YORK, BOSTON, PHILADELPHIA and BALTIMORE, for the sale of our goods, and he is authorized to sell at our lowest factory rates.

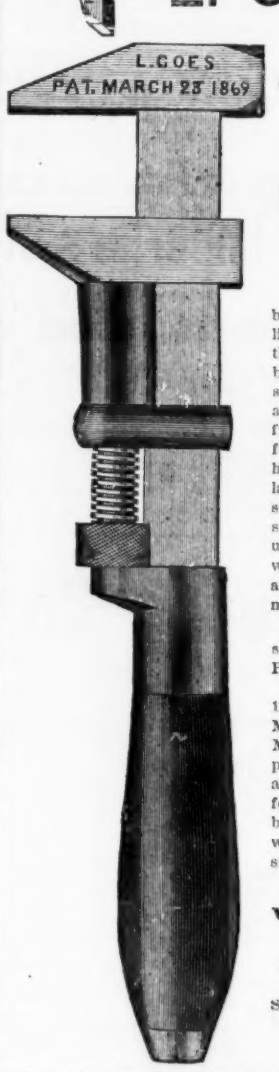
Ohio Butt Co.

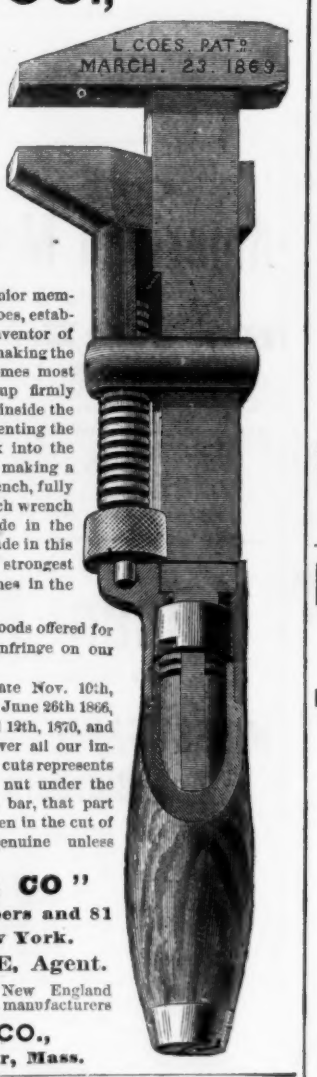
L. COES & CO.,

Manufacturers of

L. COES'
Genuine Improved
PATENT
SCREW
WRENCHES,

Worcester, Mass.





Our Mr. L. Coes, formerly senior member of the firm of L. & A. G. Coes, established in 1839, is the Original Inventor of the Screw Wrench, and has, by making the bar *wider*, where the strain comes most severe, and screwing a nut up firmly against four *square* shoulders inside the ferrule, thereby *effectually* preventing the ferrule from being thrust back into the handle or getting loose, and making a larger screw than in the old wrench, fully succeeded in making a 12 inch wrench stronger than a 15 inch made in the usual manner. All sizes are made in this way, and are undoubtedly the strongest and best finished Screw Wrenches in the market.

There are *Imitations* of our goods offered for sale, that, without question, infringe on our Patents.

We hold Patents bearing date Nov. 10th, 1863 (re-issued June 1st, 1869), June 26th 1866, March 23d, 1869 (re-issued April 12th, 1870, and May 14th, 1872), which fully cover all our improvements. One of the above cuts represents a sectional view, showing the nut under the ferrule, and the strengthened bar, that part being covered by the jaw, as seen in the cut of wrench complete. None genuine unless stamped

"L. COES & CO"

Warehouse, 97 Chambers and 81 Reade Streets, New York.

HORACE DURRIE, Agent.

Parties ordering from the New England States can order direct from the manufacturers

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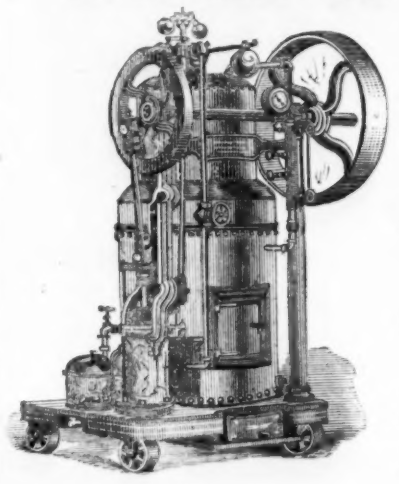

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Circular Saw Mills, and all kinds of Mill Work and Machinery.

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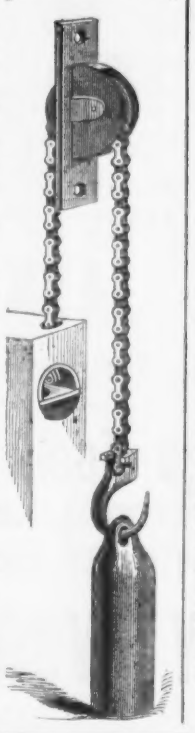
Manufacturer of

Brass & Copper Chain,



And patented attachments for same, for suspending windows, from 100 to 1500 lbs. Sashes can be suspended with my Chain and attachments in a shorter time and with less trouble than by using the ordinary common cord. I am now offering the Chain and fastenings cheaper than any other in the market. Also manufacturer of the MORTON & BREMNER'S Straight and Circular Spring Balances. Established in 1842.

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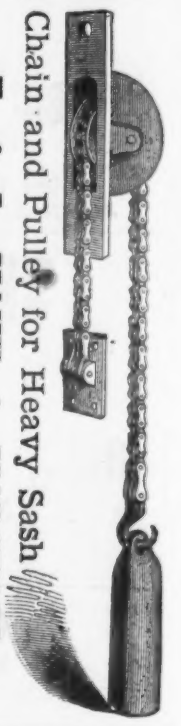
SASH CHAIN.

The Best and Cheapest made.



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Manufacturers of every description of
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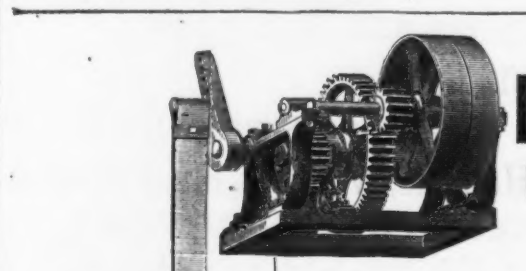
Pure Bronzed Metal and Hand-Plated Knobs, Hinges, &c.,
Agents for Gauthier's Black Lead Crucibles.
Agency and Depot of the TRENTON LOCK COMPANY.



Peck's Patent
Drop Press
MILO PECK & CO.

SOLE MANUFACTURERS.
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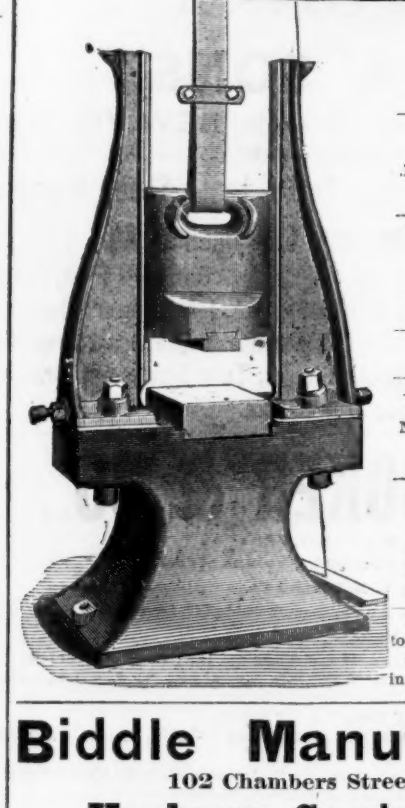

PRICE LIST.

FOR FORGING.

No.	Weight of Hammer.	Distance between Uprights.	Lift of Hammer.	Price Complete.
2	100 lbs.	8 in.	24 in.	$ 330 00
3	150 "	10 "	30 "	467 00
4	250 "	12 "	30 "	750 00
5	400 "	16 "	30 "	900 00
6	650 "	16 "	30 "	1200 00
7	1000 "	16 "	30 "	1800 00
8	1500 "	16 "	30 "	2500 00

FOR STAMPING SHEET METALS.

No.	Size of Die Bed.	Weight of Hammer.	Price of Drop without Lifter.	Price of Lifter.
1	6 in.	50 lbs.	$ 137 50	$ 82 50
2	8 "	100 "	212 50	137 50
3	10 "	150 "	300 00	220 00
4	12 "	250 "	400 00	340 00
5	16 "	400 "	550 00	480 00
6	20 "	650 "	750 00	520 00
7	24 "	1000 "	1280 00	680 00
8	36 "	1500 "	1850 00	850 00

All sizes larger than No. 3 have Wrought Iron Cranks to the Lifter.

Our Patent Drop Lifter can be applied to any Drop in use.

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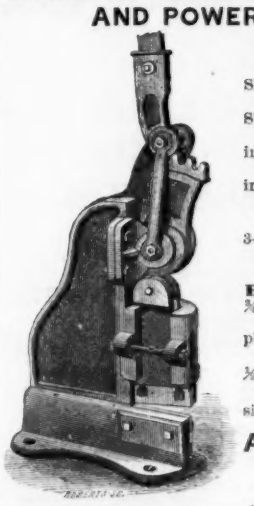
Hardware Specialties, Fine Tools,

IMPROVED HAND AND POWER DRILL PRESSES, AND HAND AND POWER SHEARS AND PUNCH PRESSES.



Patent Self Feed Hand Drill	Price, $60 00
Patent Self Feed Single Speed Power Drill, Counter Shaft and Pulleys complete	Price, 85 00
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Round Bar Hand Shear, cuts round iron, ¼ to 1¼ inch	Price, $ 6 to $100
Square Bar Hand Shear, cuts square iron, ¼ to 1 inch	Price, 20 to 100
Flat Bar Hand Shear, cuts ¾x1-16 to 2x⅜	Price, 7 to 45
Plate Iron Hand Shear, cuts boiler plate any width, 3-16 to ¾	Price, 42 to 130
Hand Punch Press, punches ⅜x⅜ to ⅝x⅝	Price, 25 to 200
Combined Hand Punch and Round and Flat Bar Shear, punches 1-16x1-16 to ¾x¾, cuts round iron ½ to ¾, cuts flat bar 2x¾ and under	Price, 15 to 160
Hand or Power Plate Iron Shear, cuts ⅜ boiler plate any width	Price, 175 to 220
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ROLLER TUBE EXPANDERS

And Direct-Acting Steam Hammers.

Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order.

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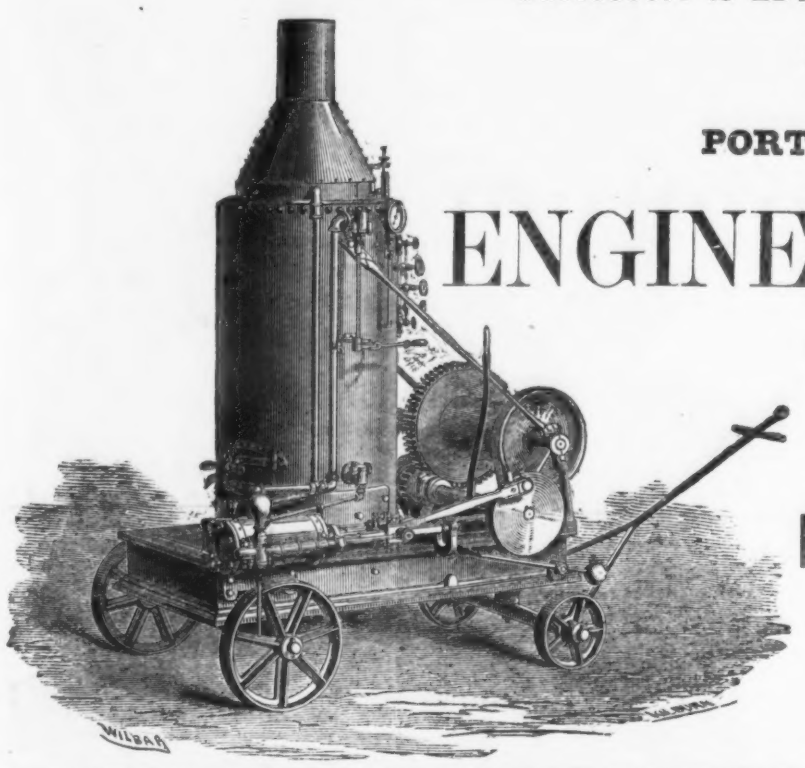

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PORTABLE HOISTING ENGINES, &c.

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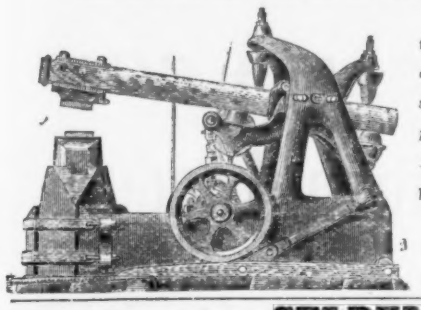

This Hammer has many valuable improvements made useful in the device for cushioning the blow, thereby relieving all the working parts from that jar and concussion which is the destroying element of other Helve Hammers. It is made Adjustable in Line of Action, Length of Stroke, Rapidity of Motion, and Weight of Blow, all of which are controlled at the will of the operator. They have *Larger Capacity, Cost Less,* are more *Durable,* take up *Less Room,* do *More* and *Better Work* at *Less Expense* for Power, than any other Hammer in use. We guarantee them fully as recommended. For particulars, address

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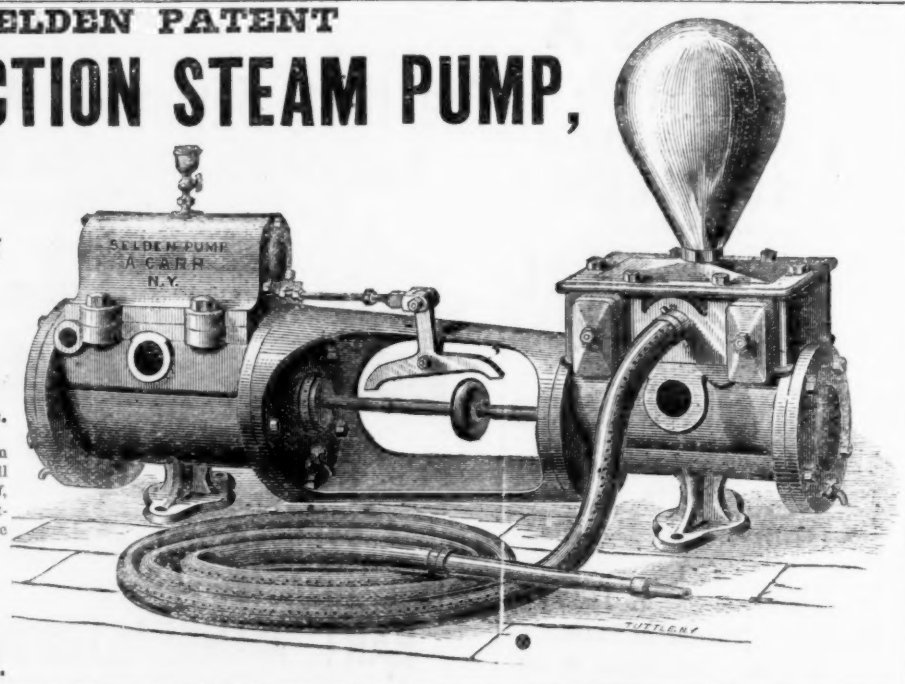
Patented August 2nd and December 20th, 1870.

Tank Pump, with Boiler Feed Attachment.



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And for all purposes for which Steam Pumps can be used. Sold under full guarantee. Money will be returned if, from any cause, they should prove unsatisfactory. Send for Circular and Price List, fully describing them, to

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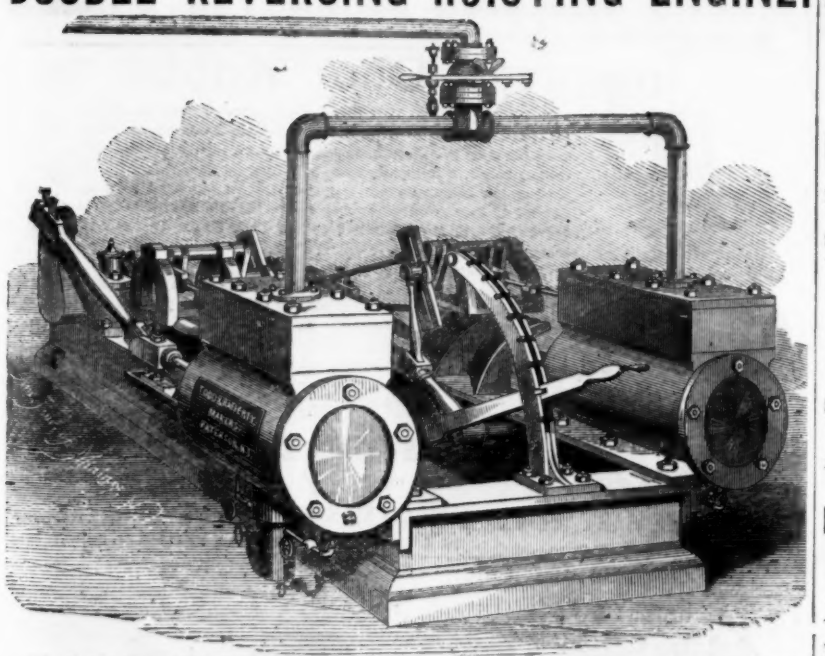

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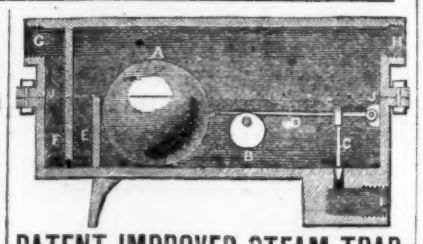

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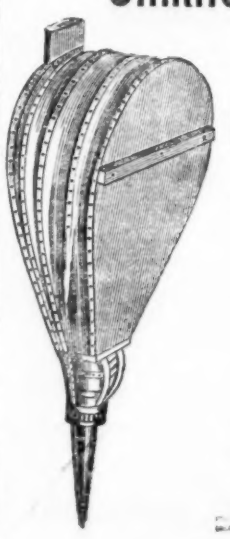

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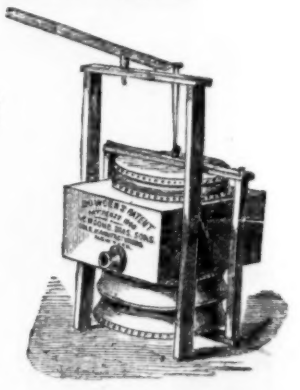

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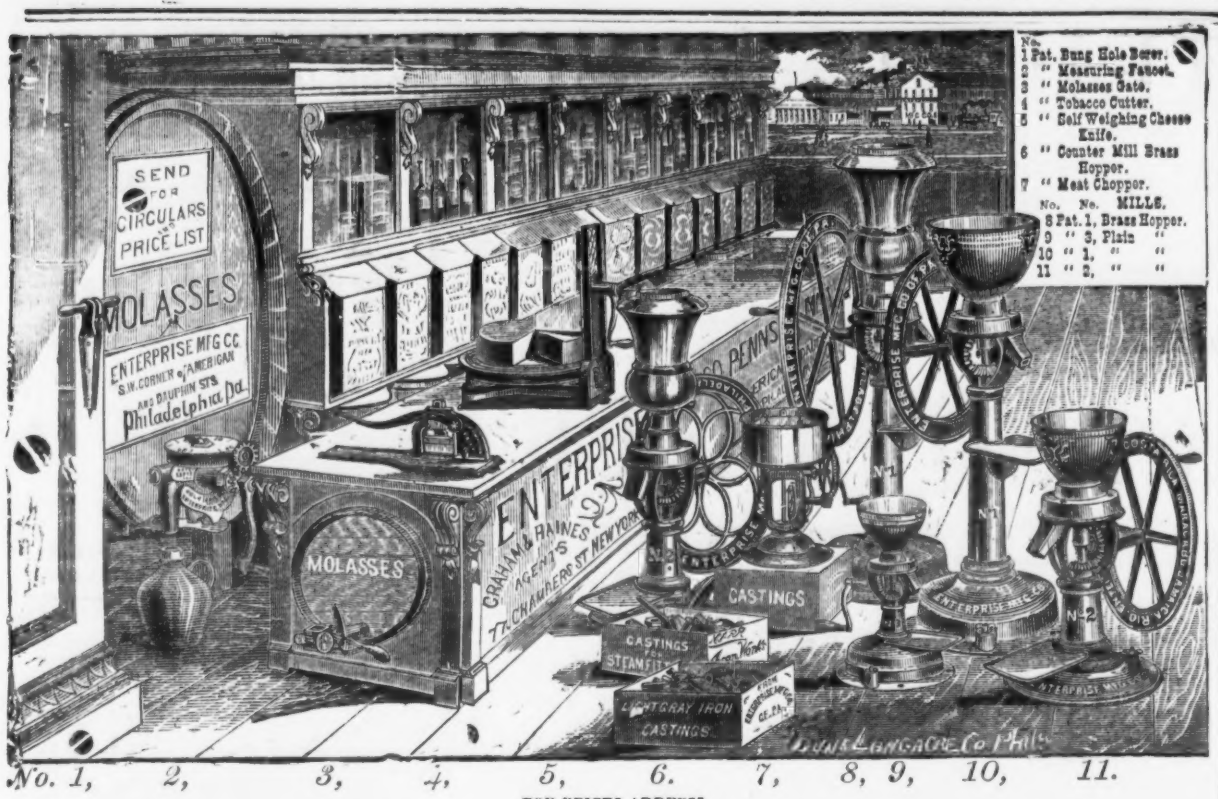

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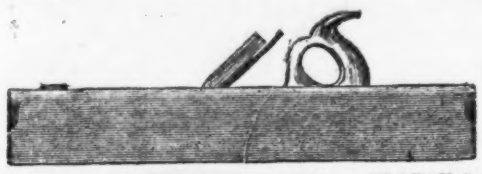

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Factories at KENSINGTON, CONN.

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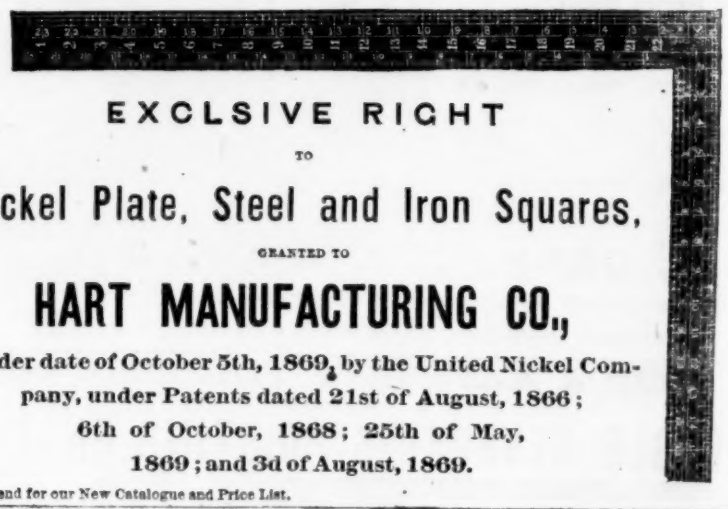

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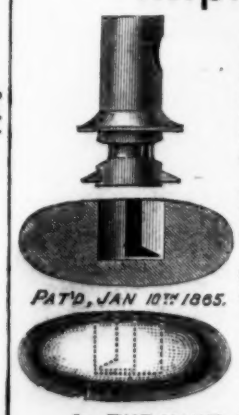

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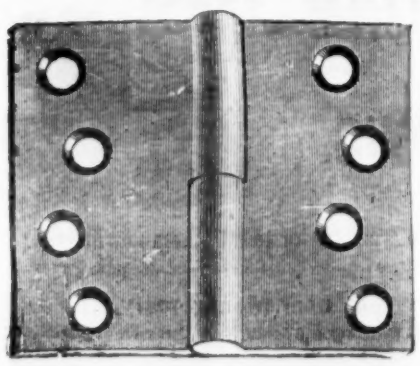

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Manufactured by the

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Sold by all Hardware Dealers.

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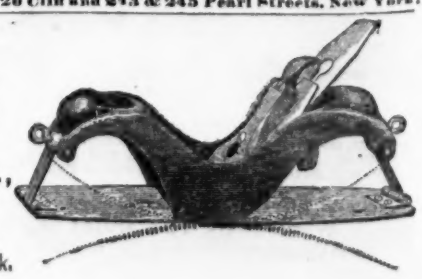

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Butts.—Cast Fast Joint, Narrow ... dis 40 %
" " Broad ... dis 40 %
Cast Loose Joint ... dis 50 %
" Acorn Drilled ... dis 40 @ 40&5 %
Wrought Loose Pin ... dis 30&5 %
" Table Hinges and Back Flaps ... dis 30 %
" Narrow ... dis 30&5 %
" Loose Joint ... dis 35&5 %
Parker's Blind Butts / Shepard's " " / Clark's " " ... dis 40 %; by the case, dis 40&10 %
Garretson's " ... dis 45 %; by the case, dis 50 %
Lull & Porter's " ... dis 25&10 %
Chains.—German Halter ... gold list dis 20 @ 25 %
" Coil ... gold list dis 20 @ 25 %
Galvanized Pump ... ℘ lb 15c
Best Proof Coil Chain—

℘ lb	13½	10½	10	9½	9¼	9	8½c gold
	3-16	¼	5-16	⅜	7-16	½	⅝ in.

By the cask, 560 lbs., discount ½c per lb. Common Chain, ½c per lb. less than proof.

Chisels.—Socket Framing ... dis 60 @ 60&5 %
Socket Firmer ... dis 60 @ 60&5 %
Tang " ... dis 40 @ 40&5 %
Beaty's Framing and Firmer ... dis 10 @ 10&5 %
Casters.—Porcelain Wheel ... dis 20&10 %
Iron ... dis 20&10 %
Brass ... dis 20&10 %
Clothes Wringers.—Universal ... per doz $72 00
Novelty ... " 72 00
Reliance ... " 72 00
Providence ... " 72 00
Orders for 5 dozen, discount $3 per dozen.
King Wringers (Iron Frame) ... per doz $68 00
Coffee Mills.—Common Box and Side ... dis 10 @ 15 %
Patent Box and Side ... dis 10 @ 15 %
Cutlery.—American Pocket (best) ... dis 20 @ 25 %
Landers, Frary & Clark, J. Russell & Co. and Lamson & Goodnow Mfg. Co. Manufacturers' net prices.
Drawing Knives.—Hart Mfg. Co.'s ... dis 60 @ 60&5 %
Concave Adjustable Handle ... dis 10 %
Beaty ... dis 10 %
Files.—Nicholson Mill Files ... new list, $5 00 to £ cur
Nicholson Bastard ... " 5 00 to £ cur
" Taper ... " 5 00 to £ cur
Butcher's Mill ... $5 75 to £ gold
" Bastard ... 5 50 to £ gold
" Taper ... 5 50 to £ gold
Moss & Gamble—Mill, Taper and Bastard ... 5 50 @ 5 25 to £ gold
Fluting Machines.
Royal, No. 1, 4½ inch Rollers ... list $6 00
" No. 2, 6 " " ... list 7 00
Hammers and Hatchets.
Yerkes & Plumb's ... dis 10 %
Hammond & Son's ... dis 5 %
Beatty's ... dis 10 %
Hinges.—Strap and T ... dis 30&10 @ 40 %
Bonney's No. 1 Gate ... dis 25 %
" No. 2 and 3 ... dis 35 %

Horse Nails.

Nos.	6	7	8	9	10
Ausable	27	25	24	23	22
Globe	29	26	25	24	23
Brundage	26	24	23	22	21
Nos.	5	6	7	8	9	10
Putnam	32	28	26	25	24	23

On Ausable, Globe and Brundage 1000 lb lots ... dis 5 %
Knobs.—Door (regular manufacture) ... dis 40 %
Porcelain and Mineral ... dis 40 %
Locks and Latches.—Rim and Mortise ... dis 40 %
Till and Cupboard ... dis 25 %
American Padlocks ... dis 40 %
Trunk Locks ... dis 5 @ 10 %
Thumb and Roggens Latches ... net @ dis 10 %
Mattocks.—Long and Short Cutter ... dis 15 %
Western Pattern ... dis 15 %
Pennsylvania Pattern ... dis 15 %
Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets ... dis 20 %
Stebbins' Gates ... dis 60 @ 60&10 %
Lincoln's " ... dis 40 @ 40&10 %
Landers, Frary & Clark's Petroleum ... dis 10 @ 10&10 %
Taylor's Petroleum Faucets ... dis 20 @ 20&10 %
Rakes.—Cast Steel Garden ... dis 30 %
Malleable Garden ... dis 33⅓ %
Wood Head Iron Teeth ... dis 30 @ 40 %
Rules.—Stanley Rule and Level Co ... dis 60 @ 60&10 %
Steven's and Hubbard's ... dis 60 @ 60&10 %
Squares.—Steel and Iron, new list ... dis 50 %
Saws.—Disston's Cross Cut ... dis 12½ %
Disston's Hand ... dis 12½ %
W. McNiece's H'd. Cross-Cut & Circ'r, new list ... dis 15 %
Boynton's Lightning, new list ... dis 30 %
Shovels and Spades.
Rowland's Plain Back, list Feb. 1873 ... dis 20&10 %
" Back Strap " ... dis 20&10 %
Oliver Ames & Sons ... new list dis 10 %
Brady Shovel Co ... dis 7½ %
Sad Irons.—Reading (planed face) ... per lb. 4½c.
Coquanock (polished face) ... " 4½c.
Stove Polish.—Gem ... ℘ gross, $5·00
Onyx ... " $5·00
Scythes.—Golden Clipper ... ℘ doz. $11·50
Clipper No. 10 ... " 10·50
Common Scythes ... ℘ doz $7·00 @ 10·00
Screws.—Iron ... new list, April 1st, 1873, dis 47½ %
Brass ... dis 50&10 %
Spoons.—
Plated Spoons, Rogers Bros.' ... new list dis 30 @ 30&5 %
Britannia Spoons ... dis 40 @ 40&5 %
German Silver ... new list dis 10 @ 15 %
" Light ... new list dis 15&5 %
Try Squares.—Winterbottom ... dis 10 @ 15 %
Stanley Rule and Level Co ... dis 40&10 %
Willis Thrall, No. 2 ... dis 30&10 %
Disston's No. 2 ... dis 40 %
Tacks, &c.—Half Weight Tacks ... dis 67½ %
" " by the case ... dis 67&7½ %
Clout and Finishing Nails ... 7½ %
" " " by the case ... dis 7½ %
Traps.—Genuine Oneida—Newhouse list ... dis 20 %
Imitation " " " ... dis 20&10 %
Wrenches.—Coes Genuine ... dis 30&10 %
Coes Imitation Wrought Bar ... dis 45 @ 45&5 %
" " Malleable Bar ... dis 50 @ 50&5 %
" " (Kellogg) Malleable Bar ... dis 55 @ 60 %
Tafts Pattern ... 60&10 %
" " Kelloggs ... dis 60&10 %
Wire.—No. 0 to 18 ... dis 30 @ 35 %
No. 19 to 26 ... dis 40 %
No. 27 to 36 ... dis 33⅓ @ 35 %
Coppered 0 to 12 ... dis 1 @ 20 %
Tinned Broom Wire ... dis 15 @ 20 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.

Nov. 3, 1873.

Axes, Chopping—"Francis Axe Co" ... $13 00 @ $14 50
Augers—C. S. Cut ... dis 30&10 %
Bits, Auger—Pierce's ... dis 25 %
Jennings' ... dis 10 %
Bells, Cow—Yaw's Genuine ... dis 20 %
Bellows—Smiths' ... dis 20 %
Bolts—Carriage and Tire ... dis 70&10 %
Braces, Bit—Barber's ... dis 40 %
Spofford's Patent ... dis 40 %
Brads, Cut ... dis 50&7½ %
Boards—Stove, Brooks' Patent ... dis 30 %
Butts—Brass ... dis 20 %
Cast Loose Joint ... dis 50 %
" " Pin ... dis 45 %
" " " Japanned ... dis 45 %
" " " Silver Tipped ... dis 35 %
Wrought Narrow ... dis 30 %
" Broad, Loose Joint ... dis 35 %
" Table and Back Flaps ... dis 25 %
Wrought Butts, Loose Pin ... dis 35 %
Belting—Rubber ... dis 30 @ 33⅓ %
Leather, new list ... dis 30 @ 30&5 %
Beaters, Egg, "Peerless" ... per doz $4·50
Brick—Bath (box of 2 doz) Best English ... $1·50
"Rutherford" ... $1·25
Bung Borers—"Enterprise" ... dis 20 %
Chalk—White, Carpenter's ... ℘ gross, 60c
Red, Carpenter's ... " 80c
Blue, " ... " 90c
Crayon School ... " 11c
Chisels—Firmer Socket ... dis 60&10 %
Framing Socket ... dis 60&10 %
Corner Socket Chisels ... dis 60&10 %
Slick's Carpenters' ... dis 60&10 %
Castings—Malleable ... ℘ lb 10½c
Cherry Seeders ... per doz $12 00

Elbows—Corrugated	5	5½	6	7	
Charcoal	$4·25	5·25	5·25	6·50	dis 15 %
Russia	10·00	13·00	13·00	14·00	

Files—Wheeler, Madden & Clemson's ... dis 45 %
Freezers, Ice Cream—"Champion" ... dis 33⅓ %
Gates—Molasses—
Patent Self-Measuring ... ℘ doz., $42 00; dis 20 %
Hinges—Window Blind—
Clark's No. 20 ... dis 50&5 %
Shepard's Standard, and Clark's ... dis 40&10 %
Garretson's ... dis 40, 10&10 %
Wrought Strap and T ... dis 30&7½ %
Hods, Coal—Plain, Black and Galvanized ... net @ 10 %
Funnel, Black and Galvanized ... net @ 10 %
Fancy and Helmet ... net @ 10 %
Palace Coal Vases ... net
Hammers—Maydole's ... net
Yerkes & Plumb's ... dis 5 @ 10 %
Hooks and Staples—Wrought ... dis 60 %
Hooks—Belt ... dis 50 %
Hasps and Staples—Wrought ... dis 60 %
Sad Irons ... ℘ lb 4½c
Kettles—Brass ... ℘ lb, 50c
Enameled ... new list dis 40 %
Knives, Drawing—Oval No. 1 ... dis 60&10 %
Razor Blade ... dis 50&10 %

Lanterns "Peerless,"	No.	1	5	10	
	℘ doz	$26 00	$11 25	$13 75	dis 10 %
"Radiant"	No	75	100	150	175
	℘ doz	$13 13	$13 13	$22 50	$22 50 dis 20 %

Tubular ... $11 50
" with Guards ... 12 00
Machines—Apple Paring, "Reading." ... $8·50 ℘ doz
Mills, Coffee—Box and Slide, common ... dis 15 %
Box Union and Eagle ... dis 15 %
"Enterprise" ... dis 20 %
Nails—Cut, Chesapeake ... $4 37½
Clout and Finishing ... dis 7½ %
Shoe ... dis 7½ %

Horse, Ausable	No. 5	6	7	8	9	10
	30	27	25	24	23	22c

" " Finished & Pointed ... add 1c ℘ lb
" " 1000 lbs ... dis 5 %

" Clinton	No. 6	7	8	9	10
	22	20	19	18	17c

Packing—Rubber ... dis 30 @ 33⅓ %
Pencils, Slate—Soapstone ... 4 5 6 in. / 30 40 50c. ℘ 100
Case lots ... dis 20 %
Paint—White Lead, U. S. Gov't ... ℘ lb 9 c
Rivets—Iron, Black and Tinned ... dis 20 @ 25 %
Copper ... dis 10 %
Rope—Manila, ½ inch and larger ... ℘ lb 17½c
Rules—Boxwood and Ivory, Stephens ... dis 50&10 %
Screws—"American Screw Co"—
Flat Head, Iron ... dis 47½ %
Flat Head, Brass ... dis 60 %
Staples—Blind, Boardman's Pat., ½ & ⅝ ... ℘ lb 37½c
Skates—White's ... dis 20 %
Barney & Berry's—N. Y. Club Japanned Top ... $2 20
" " B. & B. Club Blued Top ... 2 85
" " B. & B. all Clamp Fastening, Nickel Plated ... 4 25
" " B. & B. Rink, Nickel Plated ... 10 50
Straps, Skate—Russet and Black ... net @ 20
Spoons, Iron Tinned ... dis 10 %
" by the case ... dis 20 %
Plated Rogers' A No. 1 ... dis 30&5 %
Britannia ... dis 40 %
Squares—Steel and Iron ... new list 50 %
Shoes, Horse—H. Burden & Sons ... ℘ keg $6·50
Shovels & Spades—Shepard, Forsyth & Dennison ... dis 20 %
Saws—Henry Disston & Sons ... dis 10 %
Scales—Buffalo Scale Works ... dis 25 %
Fairbanks ... dis 15 %
Shears—Seymour's ... dis 50@10 %
Traps, Steel—Newhouse ... dis 20 %
Tacks—Half Weight Am. Iron ... dis 67½&7½ %
Vises—Parallel, Buffalo ... dis 15 %
Wrenches—Coes' genuine ... dis 30&10 %
Coes' Imitation ... dis 50&10 %
Tafts' Pattern ... dis 65&10 %
Ware—French, Tinned and Iron
Stamped and Japanned
Cast Iron Hollow ... dis 25 %
Tin Plates.—Add for each X ... 2·50

10x14, IC. Charcoal	$11·75	14x20 C. terne	$11·25
12x12, "	12·25	20x28 C. "	24·50
12½x17, "	11·25	20x28 X. "	29·00
14x20, "	12·75		

Pig Tin—Straits ... 38c @ 39
Banca ... 44c @ 45
Bar Tin ... 40c
Solder ... No. 1, 21 c; No. 2, 19 c
Sheet Zinc—

"Lasalle"	570	300	200	100 lb casks
	10·50	$10·70	$10·70	$10·80 ℘ 100 lbs

Iron Wire—Bright and Annealed ... dis 30 %
Coppered ... dis 25 %
Tinned ... dis 15 %
Tinned Broom, Nos. 20, 21, 22 / 20c, 21c, 21c ... dis 20 %
Copper—Sheathing 14 @ 18 oz ... ℘ lb 37c
Planished ... ℘ lb 44 @ 46c
Bottoms ... ℘ lb 37c
Bolts ... ℘ lb 40c
Braziers' Sheets ... ℘ lb 40c
Sheet Iron.—
18 Common ... $5 80
24 Common ... 6 00
24 W. D. Wood & Co., Smooth Finish ... 6 75
Am. Russia ... A. 14c B. 12c
Gen. Russia, No. 1 stained ... 20c
" " clean ... 21c
Galvanized ... dis 25 %

PITTSBURGH.

Card Rates, 60 days.

Flat Bar.—		1½ & 1⅜ x ⅜ to ¾ in	3·5c
1½ to 4 x ⅜ to 1 inch	3·3c	1 & 1⅛ x ⅜ to ⅝ in	3·6c
4½ to 6 x ⅜ to 1 inch	3·5c	⅝, ¾ & ⅞ x ⅜ to ⅝ in	3·7c
1⅛ to 6 x 1⅛ to 1½ in	3·7c		
Horse Shoes.—		Nail rods	7·2c
All sizes	4·8c		
Heavy Bands.—		⅞ to 1⅛ x ¼ & 5-16 in	4·3c
3½ to 6 x ¼ & 5-16 in	3·9c	⅝ to ¾ x ¼ & 5-16 in	4·5c
1½ to 3¼ x ¼ & 5-16 in	4·0c		
Light Bands.—			
3 to 6 x 3-16 to No. 12	4·3c	1 to 1⅜ x 3-16 to No. 12	5·9c
1½ to 2⅞ x 3-16 to No. 12	4·5c	¾ to ⅞ x 3-16 to No. 12	5·5c
Hoops.—2¼ to 3 in	4·6c	1 in	5·8c
3½ to 4⅞ in	4·6c	⅞ in	6·3c
1⅞ to 2 in	4·8c	¾ in	6·8c
1⅜ to 1 11-16 in	5·1c	⅝ in	7·3c
1⅛ & 1¼ in	5·4c	½ in	7·8c
Round and Square.—			
1 to 1⅞ in	3·3c	⅞ to 7-16	4·0c
2 to 2⅞ in	3·6c	⅜ in	4·1c
3 to 3½ in	3·8c	5-16 in	4·5c
3⅞ to 4 in	4·8c	¼ in	5·9c
⅝ to 9-16 in	3·7c	3-16 in	6·9c
Oval Iron.—			
⅞ to 1¼ in	3·9c	½ in	4·3c
⅝ to ¾ in	4·1c	⅜ in	4·9c
Half Oval and Half Round.—			
⅞ to 1¼ in	4·2c	½ in	5·4c
⅝ to ¾ in	4·7c	⅜ in	6·9c

	Bolled.	Charcoal.	Jun.
Sheet Iron, 10 to 14	5·3	6·3	8·3
" 15 to 20	5·5	7·0	8·5
" 21 to 24	5·7	7·2	8·7
" 25 to 26	5·9	7·4	8·9
" 27	6·1	7·6	9·1

All sheets over 28 in. wide, ½c. ℘ lb extra.

Tank Iron—		Heads flanging	9·0c
3-16, ¼ & ⅜ in. thick	5·3c	Plow Slabs	5·9c
Boiler Plate Iron	5·6c	Plow Wings	6·4c
Heads not flanging	6·2c		
Railroad Iron—Countersunk and Punched.—			
1½ x ⅜, 7-16 & ½ in	4·3c	1½, 1⅝ & 2 x ½ & ⅝ in	3·8c
1½ x ¼ & 5-16 in	3·3c	1½ x ⅜ in	4·0c
Extras for Cutting to Length.—			
Flat bars and rounds and squares	0·1c	Light bands and wagon box iron	0·2c
Flat bars for tire	0·1c	Hoops	0·8c

The following are the Card rates of Lewis, Oliver & Phillips:
Iron, standard list, assorted sizes, for large orders, 3·3c, card rate, 2 % off net.
Flat Rail (1½x¼), punched and coun'sunk ... 4·7c ℘ lb net
Iron Wedges ... 5c ℘ lb net
Norway Nail Rods ... 9½c ℘ lb net
Crow Bars (in ordering please state whether "Wedge" or "Pinch" point) ... 6½c ℘ lb net
Beetle Rings ... 9½c ℘ lb net
Fence Pickets—
⅝ round, bent to shape, 80c ℘ ft. of fence, less 5 % off net
Discount off Standard List.
Carriage and Tire Bolts (new list) ... 70&5 % off net
Plow Bolts ... 25 % off net
Stove Bolts ... 5 % off net
Machine and Square Head Bolts ... 30 % off net
Coach and Lag Screws ... 30 % off net
Bolt Ends ... 25 % off net
Harrow Teeth, in lots of 1 ton or more, packed in casks, 1 in. diam. 4½c ℘ lb net; ¾, ⅞ in. diam. 4½c ℘ lb net; ⅝ in. diam. 4½c ℘ lb net.
Patent Headed Harrow Teeth, packed in casks, ½c ℘ lb ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 7c ℘ lb net; 9-16 in. diam. 8c ℘ lb net; ½ in. diam. 9c ℘ lb net. 1c ℘ lb extra when less than 1 keg of each size is ordered.
Screw Hook-and-Eye Hinges, ⅝ to 1 in. diam. 9½c ℘ lb net; ⅝ in. diam. 10½c ℘ lb net; ½ in. diam. 12½c ℘ lb net.
Screw and Strap Hinges, in lots of 100 pairs or more, 14 to 36 in. long, 6½c ℘ lb net; 8, 10 & 12 in. long, 8c ℘ lb net.
Strap and T Hinges ... 40 % off net, delivered as customary
Screw Hitching Rings ... $5 50 ℘ 100 net
Duck Nest Tuyere Irons ... $15 00 ℘ doz net
Cast Iron Washers ... ℘ lb 4½c net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long ... ℘ lb 4½c net
1 to 2 in. diam. from 4 to 8 ft. long ... " 5 c net
1 to 2 in. diam. from 1½ to 4 ft. long ... " 5½c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long ... " c net
⅝, ¾ and ⅞ in. diam. from 1½ to 4 ft. long ... " 6½c net

WAGON HARDWARE.

Wagon Box Strap Bolts—

10 in. long by 7-16 at Screw End, ℘ set of 8 bolts				55c
12 "	½	"	8 "	70c
10 "	9-16	"	8 "	90c
12 "	9-16	"	8 "	90c
14 "	9-16	"	8 "	$1 00
10 in. long by ⅝ at Screw End, ℘ set of 8 bolts				1 00
12 "	⅝	"	8 "	1 00
14 "	⅝	"	8 "	1 10
16 "	⅝	"	8 "	1 20

5c ℘ set for each additional inch over 14 in. All lengths made.
Wagon Box Rods, narrow track, each ... 18c
" " wide track, each ... 20c
Single Tree Irons, ℘ set of four pieces ... 38c
Wrought Iron Bolster Plates, 2¾ in. wide, ℘ set ... 60c
" " 3 " " ... 65c
" " 3¼ " " ... 70c
" " 3½ " " ... 75c
Wagon Brake Ratchets, each ... 16½c
" " " finished with guard, each ... 45 c
Wrought Hammer Straps, heavy pattern, each ... 16 c
" " " light " each ... 13½c
" Rub Irons, each ... 11 c
Stay Chain Hooks, each ... 8 c
Double and Single Tree Clips, figure 1, each ... 9 c
" " " " 2, each ... 10 c
" " " " 3, each ... 12 c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks and Clips, in lots of 100 sets ... dis 25 %
Wagon Box Staples, 1½ to 2½ in. to clinch. ℘ 1000 $12 50 net
" " Box Iron, to rivet on. ℘ 1000 8 50 net
Neck Yoke Eyes, each ... 5½c net
" " with ⅜ rings, each ... 8 c net
King Bolts, ⅞, 1, 1⅛, and 1¼ in. diam ... ℘ lb 4½c net
Wagon Rivets, ex. large, flat, oval and steeple head, ½ in. diam. all lengths ... " 9½c net
Wagon Rivets, 3-16 in. diam., all lengths ... " 11½c net
" " & Nails, in 5 lb paper boxes ... ℘ lb 1c extra
" " in 25 lb wood " ... " ½c extra
Wagon and Hinge Nails, ¼ in ... ℘ lb 17 c net
" " " 3-16 in ... " 19 c net
Double Tree Plates / Coupling " / Tongue " ... " 9 c net
Neck Yoke Plates ... " 12 c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ℘ lb as Band Iron.
Wagon Chains, Stay Lock and Tongue, 5-16 in, ℘ lb 11½c net; ¼ in., 12½c. net

DETROIT.

(Reported by Messrs. Jewett & Root.)

Tin Plate.—Best Charcoal		**Copper.**—	
IC, 10x14	$11 50	Sheathing	37½c
IX, 10x14	14 25	Copper Bottoms	39½c
XX, 10x14	17 00	**Planished Copper.**—	
IC, 12x12	12 00	Sheathing, 14x48	46c
IX, 12x12	14 75	Boiler Size, No. 7	48c
IC, 14x20	12 50	" " No. 8	48c
IX, 14x20	15 25	" " No. 9	48c
XX, 14x20	18 00	**Pig Tin.**—Large Pigs	35c
XXX, 14x20	20 75	Small Pigs	36c
XXXX, 14x20	23 00	Bars	37c
DC, 100 Plate	11 00	**Solder.**—No. 1	21c
DX, "	13 75	No. 2	19c
DXX, "	16 50	**Bright Wire.**.dis 30% off	
DXXX "	19 25	**Sheet Iron.**—	
DXXXX 100 Plate	22 00	No. 18 Am. Com	5·8c
IX, 14x14	24 75	No. 24 Am. Com	6·0c
IC, 10x14 W	11 00	Pat. Am. Russia "A,"	
IX, 10x14 W	13 75	Nos. 24, 25 & 26	14c
Roofing Tin.—Best Char.		Pat. Planished Russia	15c
IC, Terne, 14x20	$11 00	Russia No. 9, 10, 11 & 12	21½c
IX, " 14x20	13 75	W. D. WOOD'S & CO.'S SHEET IRON.—	
IC, Terne, 20x28	24 00	Nos. 15 to 20 Smooth	$7 05
IX, " 20x28	28 50	" 21 to 24	7 25
Coke Tin.—		" 25 & 26	7 45
IC, 10x14 Coke	$9 50	" 21 to 24 Char'l	8 75
IX, 10x14, Coke	12 25	" 25 & 26 "	8 95
IC, 14x20, "	10 50		

Sheet Zinc.—Any width ... 10½c

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.

Tin Plate.—I. C. 10x14 Charcoal ... $13·50 @ 14·50
I. C. 10x14 best Coke ... 12·00 @ 15·50
I. C. Terne, 14-20 ... 12·00 @ 13·00
I. C. " 20-28 ... 26 00 @ 27·50
I. C. Continuous ... 28·00

Pig Tin.—		Straits	℘ lb 41c
Banca	℘ lb 47c	English	41c
Solder.—		A 1	℘ lb 24c
S. & Co	℘ lb 28c	Roofing	" 22c
Lead.—Pig	℘ lb 7½c @ 8c.	Bar	℘ lb 8c @ 9c
Copper.—			
Ingot	℘ lb 30c @ 31c	Brazier, 6 to 9 lb	℘ lb 46c
Planished	" 51c @ 53c	" 10 to 14 lb	" 43c
Sheathing	" 44c @ 46c	" 14 to 100 lb	" 40c
Bolt	40c	Copper Bottoms	" 40c

Zinc.—Cask, 500 to 1000 lbs ... ℘ lb 11 c
Case, 100 lbs ... " 11½c
Slab ... " 8½c @ 9c

Brass.—		Roll, No. 38 to 40	℘ lb 50c
Roll, No. 6 to 30	℘ lb 45c	Wire, No. 0 to 20	℘ lb 50c
" 30 to 38	" 65c	" 20 to 25	" 60c
Babbit Metal.—		Black Lead	℘ lb 25c
Sellew & Co	℘ lb 35c	Market	15c

Antimony ... ℘ lb 20c
Bismuth ... ℘ lb $6 00
Nickel ... ℘ lb $3 50
Sheet Iron.— Russia ... ℘ lb 20c @ 22c | Am Russia A ... ℘ lb 14 @ 15c; " " B ... " 13 @ 14c

	Com. B.	Smooth Fin. S. L. U.	Smooth D Re'fd.
15 to 20	6·0c	7·5c	9·0c
22 to 24	6·2c	7·8c	9·2c
26	6·4c	8·0c	9·4c
27	6·6c	8·2c	9·6c

Galvanized Iron.—Full bundles ... dis 25 %

Nos. 18 to 20	15c	No. 27	18c
22 to 24	16c	28	20c
25 to 26	17c		

Bar Steel.—Silver, ℘ lb 21c; Crescent, 17½c.
Iron Wire ... dis 25 %
Enameled Ware ... dis 33⅓ %
One Piece Corrugated Elbows ... dis 10 %

Charcoal Iron.		Russia Iron.	
4½ inch ... ℘ doz	$3·75	4½ inch ... ℘ doz	$8·00
5 "	4·25	5 "	10·00
5½ "	5·25	5½ "	13·00
6 "	5·25	6 "	13·00
7 "	6·50	7 "	14·00

Leader Elbows—Flat Crimp Retinned.—

℘ doz.		℘ doz	
2-inch	$2 00	2½-inch	$2 25
3-inch	2 50	3½-inch	3 00
4-inch	3 50	4½-inch	4 00

Sheet Iron Bread Pans ... ℘ lb 12c
American Broilers ... ℘ doz. $13·50
Tinmen's Machines ... net list
Sad Irons ... ℘ lb, 5½c
Brass Kettles.—Ansonia ... 48c

London Metal Market.

(From The Mining Journal.)

	£.	s.	d.	£.	s.	d.
Copper—℘ ton.						
Best Selected	96	0	0	98	0	0
Tough Cake & Tile	93	0	0	95	0	0
Sheathing and Sheets	102	0	0	104	—	
Bolts	103	0	0	105	0	0
Bottoms	103	0	0	106	0	0
Old (Exchange)	85	0	0	—		
Burra Burra	93	10	0	94	10	0
Wire ... ℘ lb.	0	1	0¾	—		
Tubes ... "	0	1	0½	0	1	1
Brass—℘ lb.						
Sheets	0	0	10	0	0	11
Wire	0	0	10¼	—		
Tubes	0	0	11¼	0	0	11½
Yellow Metal Sheathing	0	0	9	0	0	9¼
Sheets	0	0	8¾	0	0	9
Tin—℘ ton.						
English Blocks	125	0	0	126	0	0
Ditto Bars	126	0	0	127	0	0
Ditto Refined	128	0	0	—		
Banca	124	0	0	126	0	0
Straits	122	10	0	123	10	0
*** Tin Plates**—† ℘ box.						
IC Charcoal ... 1 qual.	1	16	0	1	18	0
IX " ... 1 qual.	2	2	0	2	4	0
IC " ... 2 qual.	1	14	0	1	16	0
IX " ... 2 qual.	2	0	0	2	2	0
IC Coke	1	9	0	1	13	0
IX "	1	15	0	1	18	0
Canada Plates ... ℘ ton.	22	0	0	23	0	0
" at works	21	10	0	22	0	0
Spelter—℘ ton.						
Foreign	27	10	0	27	0	0
To arrive		—			—	
Zinc—℘ ton.						
In Sheets	33	0	0	34	0	0
Iron—℘ ton.						
Bars Welsh, in London	12	7	6	12	10	0
" to arrive	12	5	0	12	7	6
Nail Rods	12	15	0	13	0	0
Nail Rods, Staff'd in L'ndon	13	5	0	—		
Bars	13	15	0	14	0	0
Hoops	14	10	0	16	0	0
Bars at Works	13	0	0	15	0	0
Hoops ditto	14	0	0	16	0	0
Sheets, single	15	10	0	16	0	0
Pig, No. 1, in Wales	5	0	0	6	10	0
Refined metal ditto	7	0	0	8	0	0
Bars, common ditto	11	5	0	11	10	0
Do, merchant, Tyne or Tees	11	10	0	11	15	0
Ditto, Railway, in Wales	10	0	0	11	0	0
Ditto, Swedish, in London	19	15	0			
To arrive	20	10		21	10	0
Pig, No. 1, in Clyde	5	5	0	7	0	0
Ditto, f.o.b., Tyne or Tees	4	10	0	5	10	0
Ditto, Nos. 3, 4, f.o.b		—			—	
Railway Chairs	5	5	0	6	0	0
" Spikes	12	10	0	14	0	0
Indian Ch'coal Pigs in L'don		—			—	
Steel—℘ ton.						
Swedish, in kegs (rolled)		—			—	
Ditto (hammered)	21	0	0	21	10	
Ditto, in faggots		—			—	
English, spring	25	0	0		—	
Quicksilver—℘ bottle.	18	0	0		—	
Lead—℘ ton.						
English Pig, common	24	0	0		—	
Ditto, LB	24	0	0		—	
Ditto, WB	25	0	0		—	
Ditto, Sheet	24	15	0		—	
Ditto, Red Lead	25	0	0		—	
Ditto, White	30	0	0	32	0	0
Ditto, Patent Shot	27	5	0		—	
Spanish	23	15	0		—	

* At the works, 1s. to 1s. 6d. per box less. Terne Plates 2s. per box below Tin Plates of similar brands. Add 6s. for each X.

Steel.

THREE 1st CLASS PRIZE MEDALS. CLASSES 1, 21, 22, Great Exhibition of Industry, LONDON, 1851.

MEDAL OF HONOUR, SOCIETY OF ARTS & INDUSTRY, LONDON, 1856.

1st CLASS PRIZE MEDAL, CLASS 16 UNIVERSAL EXHIBITION OF INDUSTRY PARIS, 1855.

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SUCCESSORS TO

SAML. COCKER & SON,

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CAST, SHEET, AND BLISTER STEEL, OF EVERY DESCRIPTION.
BEST CAST STEEL WIRE, ADAPTED SPECIALLY FOR MECHANICAL PURPOSES;
Also for ROPES, NEEDLES, FISH HOOKS, PINS, CRINOLINE, &c.

BEST CAST STEEL FILES, SAWS, EDGE TOOLS,
HACKLES, GILLS, CARD CLOTHING, CARD TEETH, HACKLE AND GILL PINS,
FISH HOOKS, NEEDLES, &c.

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CHICAGO, Crerar, Adams & Co.....NEW ORLEANS, Folger & Co.
CINCINNATI, Augustus Wessel.....SAN FRANCISCO, Huntington, Hopkins & Co.

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Successor to JOSHUA MOSS & GAMBLE BROTHERS,

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MOSS & GAMBLE **SUPERIOR C. S. "FULL WEIGHT" FILES,**

Cast Steel Hammers and Sledges. Also, "M. & G." Anvils and Vises.

WARRANTED CAST STEEL, especially adapted for DIES and TURNING TOOLS, DRILLS, COLD CHISELS, PUNCHES and all kinds of MACHINISTS' TOOLS.
Celebrated Improved Mild Centre Cast Steel, for Taps, Reamers, and Milling Tools, warranted not to crack in hardening Taps of any size.
Swede Spring Steel, especially adapted to Locomotive and Railway Car Springs.
English Spring and Plow Plate Steel.
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And GENERAL MERCHANT.

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BARROW IN FURNESS,

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Steel Rails, Tyres, Wheels,

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STEEL

For Tools, Cutlery, Saws, Files, Augers, Gimblets, &c.; Sheet Cast Steel for SPRINGS AND STAMPING COLD;

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Unsurpassed, if equaled in quality.

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Established 1810.

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Steel.

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(LIMITED)

MANUFACTURERS OF THE

CELEBRATED CAST STEEL,

WARRANTED MOST SUPERIOR FOR TOOLS.

DARNALL WORKS,
ATTERCLIFFE FORGE,
WEST STREET WORKS,
} SHEFFIELD, ENGLAND.

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AND

AGENTS FOR ARMITAGE'S GENUINE MOUSEHOLE ANVILS.

NEW YORK, Edward Frith, 16 Cliff.
BOSTON, H. L. Richards, 18 Batterymarch.
PHILADELPHIA, Wm. H. Sowers.
CLEVELAND, O., Cleveland, Brown & Co.
NEW ORLEANS, Rich'd Rhodes, 71 Camp.
BALTIMORE, Md., Wm. H. Cole.
MONTREAL, Saint Paul St.
NEW HAVEN, Ct., Atwater, Wheeler & Co.

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Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

Don Works, Sheffield, England.

JOHN HOGAN, Agent.

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Cast and Double Shear

STEEL,

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table, Carving, Butcher and Shoe Knives, Turning Tools, Dies, Files, Clock or other Springs, Saws and Tools of every variety.

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In calling the attention of consumers of Steel in any of the varieties above enumerated, we would respectfully assure them of our ability to supply an article that cannot be excelled in quality, temper, and adaptation in all respects to the various purposes for which it may be required. Half a century of practical experience in all departments of Steel manufacture, a long established reputation in England, and the Continent of Europe, and in the Eastern States principally of this Country, encourage us to solicit a universal trial of our Steel for the above or other purposes for which a first class material in quality, temper, and durability is needed.

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Manufacturers of all descriptions of

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Files, Saws, Table and Pocket Cutlery, Augers, Shovels, &c.

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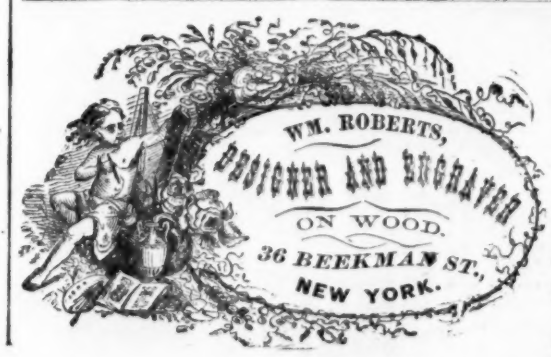

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Manufacturers of **Extra Quality Tool**

CAST STEEL,

Patent Rolled

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All descriptions of **Cast and German**

Spring and Plow Steel,

Elliptic and Side Springs, Seat Springs,

AXLES, STEEL TIRE,

Plow Wings, Shares, Cultivators, Reaper Bars, Crow Bars, &c., &c.

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ISAAC JENKS & SONS,

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MANUFACTURERS OF

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TIRE, TOE CORK, SLEIGH SHOE.

BLISTER & PLOW STEEL.

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A full assortment of "Jenks" Spring Steel in stock.

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The superiority is well known of our brands Rifle Powder:

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SAFETY-FUSE at wholesale.

CHICAGO.

(Reported by Markley, Alling & Co.)

Agricultural Implements.—
Scythes—Dunn Edge Tool Co. .... dis 25 %
Hay and Manure Forks—Otsego extra C. S. .... dis 25 %
Hoes and Garden Rakes—Jackson and Otsego ... dis 25 %
Scythe Stones .... dis 25 %
Scythe and Bush Snathes .... dis 20 %
Harvest Rakes and Barley Forks .... dis 20 %
Revolving Horse Rakes .... dis 20 %
Handles—Fork and Shovel .... dis 20 %
Cradles—Nithington, Cooley & Co. .... dis 20 %
—Genuine Morgan .... ℘ doz net $36 00

Augers and Bits.—
Ives' extra C. S. .... dis 30 % | Snell's .... dis 10 %
Jennings' .... dis 5 % | " Car Bits .... dis 10 %
Cook's .... dis 30 %

Axes.—Amoskeag Yankee .... ℘ doz $13 50
Amoskeag Crescent .... " 14 00
Hunt's Yankee .... " 14 00
Kennebeck Yankee .... " 12 00
Lippincott " .... " 13 00
" Crown .... " 14 00
" Beveled .... " 14 50
Jefford's Silver Steel .... " 13 00
Red Warrior, Beveled .... " 14 00
Kennebeck, Handled .... " 15 00
Boy's, Handled .... " 12 00

Bolts.—Carriage and Tire .... dis 70&12½ %
Cast Barrel and Shutter .... dis 20&10 %
Wrought Iron Barrel .... add 10 %
" " Square .... net list

Butts.—Cast Fast Joint, Narrow .... dis 20 %
Cast Fast Joint, Broad .... dis 20 %
" Loose Joint .... dis 45 %
" " Pin, Reversible .... dis 40 %
" " Japanned .... dis 35 %
" " Silver Tipped .... dis 35 %
Wrought Narrow, Fast Joint .... dis 30 %
" Broad " " .... dis 30 %
" " Loose " .... dis 30 %
" Loose Pin .... dis 30 %
" Table .... dis 20 %
" Brass .... dis 10 %
Garretson's Blind Butts, Wood .... doz sets $1 75
" " Brick .... doz sets 2 75
Parker's " Wood .... doz sets 1 85
" " Brick .... doz sets 2 75

Casters.—Iron Plate .... dis 25 %
Brass Wheel Plate .... dis 25 %
Porcelain Wheel Plate .... dis 25 %
" " Bed .... dis 25 %
Iron Wheel Bed .... dis 25 %

Chisels.—Butcher's Tanged Firmer .... dis 30 %
" Long Paring .... dis 30 %
Witherby Socket Framing .... dis 50&20 %
" " Firmer .... dis 50&20 %
" " Corner .... dis 50&20 %
" " Slicks .... dis 50&20 %

Coffee Mills.
Box 4 Iron .... $3 75 | Box 85 Cast Steel $13 00
" 108 " .... 5 25 | Side 50 .... 4 75
" 102 " .... 6 25 | " 60 .... 5 75
" 107 Britannia ... 7 50 | " 70 .... 7 25
" 106 " ... 8 50 | " 90 .... 18 00
" 25 Union .... 11 00 | " 15 Union 7 00
" 35 " .... 13 00 | " 20 " 8 00
" 75 Cast Steel .. 11 00

Cutlery.—American Table .... dis 20 %
" Pocket .... dis 25 %

Door Springs.—Torry .... ℘ doz $6 00
Rubber .... " 4 00
Boon's .... " 5 00

Drawing Knives.—Witherby Tool Co. ... dis 50&20 %
Ohio Tool Co. .... net list

Files.—Butcher's .... $7 00 £
Nicholson's .... $5 00 @ $5 50 £

Hammers.— | Yerks & Plumb .... net list
Maydole's .... net list | Cheney .... net list

Handles.
Extra Axe ... ℘ doz. $3 00 | Coal Pick, No. 1 .. ℘ doz $2 00
No. 1 Axe .... " 2 25 | Sledge, No. 1 .... " 2 00
No. 2 Axe .... " 2 00 | Hatchet .... " 65
R.R. Pick, No. 1 " 2 00 | Hammer, A. E. .. " 65

Hatchets.— 1 2 3
Amoskeag Shingling $7 25 $8 00 $8 75
" Claw 7 75 8 50 9 22
" Lath 7 50 8 25
" " Solid Steel 12 00

Hinges.—Strap and T .... dis 35&5 %
Screw Hook and Strap, 8 to 12 in. .... net, 9c. ℘ ℔
" " 14 to 24 in. .... net, 7½c. ℘ ℔
Hook and Eye Hinges .... net 12c. @ 16c. ℘ ℔
Gate, No. 35, State .... ℘ doz $3 50
" No. 3, In and Out .... " 3 50
" Blinn's Pat .... " 7 50

Horse Nails.—Northwestern, 8d 24c
Ausable, 8d 24c
Globe, 8d 26c

Kettles.—Brass .... 50c | Enameled .... dis 15 %
Locks and Knobs.— | EagleLock Co. .... dis 15 %
Norwalk Lock Co. dis 35 % | Am. Pad Locks .... dis 25 %
Branford " . dis 35 % | Conti'al Lock Co. .. dis 10 %
Meat Cutters.— | Woodruff Patent ... net list
Haven's Patent ... net list | Stowe's Sausage
Hale's " ... dis 10 % | Stuffers .... net list
Molasses Gates.— | Enterprise Patent ... dis 5 %
Stebbin's Patent .. dis 50 %

Nails.—10d to 60d .... per keg $4 50 @ 4 62½

Oil Stones.—Washita No. 1 .... net 30c ℘ ℔
Washita Slips .... net 60c "
Hindostan No. 1 .... net 9c "
" Axe .... net 10c "
" Slips .... net 15c "

Picks and Mattocks.—Picks, Railroad, Axe Finish .... ℘ doz $12 00
Picks, Coal, Axe Finish .... " 10 00
Mattocks, L. C., Axe Finish .... " 15 00
" S. C., " .... " 14 50
Grub Hoes, Axe Finish, No. 2 .... " 11 00

Planes.—Ohio Tool Co., Bench .... dis 20 %
Sciota .... dis 25 %
A. Howland & Co., Bench .... dis 20 %
" Fancy .... dis 20 %
Bailey Patent Iron .... dis 15 %
Plane Irons, Butcher's .... dis 30 %

Rivets.—Iron . dis 10 @ 15 % | Copper, No. 7. net, ℘ ℔, 58c
Tinned .... dis 10 @ 15 %

Rules.—Stanley Rule and Level Co. .... dis 50&10 %
Hubbard & Curtiss Mfg. Co. .... dis 50&10 %

Sad Irons.—Best A No. 1 .... ℘ ℔, 4¼ @ 4½c
" Copper Face Star ... ℘ ℔, 4¼ @ 4½c

Sandpaper.
Wiggins & Stevens, No. 0 to 1½ .... ℘ ream, net, $4 50
" " No. 2 to 3 .... " " 5 00

Sash Locks.—Champion .... ℘ gross, net, $12 00
Hopkins & Dickinson .... dis 10 %
Judd's Patent .... dis 10 %
Corbin's Patent .... dis 10 %
Clark's Patent .... dis 20 %

Saws.—H. Disston & Sons .... dis 10 %
Champion X Cut .... ℘ foot, net, 60c
M. A. & Co, X Cut .... " " 50c
Lightning Cut .... " " 66c

Screws.—American Screw Co.—Iron .... dis 45 %
American Screw Co.—Brass .... dis 50 %
" " —Blued Rd. Head .... dis 25 %

Shovels and Spades.
Ames' Black Shovels .... ℘ doz $14 50
" Polished " .... " 15 50
" Patent " .... " 18 00
Alling " " .... " 17 50
" " " Molders' .... " 18 00
Crane's Black " .... " 12 00
" Polished " .... " 13 00
Smith's " " B. S. L. H. Rd. Pt. .... " 13 50
" " " B. S. D. H. Rd. Pt. .... " 14 00
Ames' Black Spades .... " 16 00
" Polished " .... " 17 00
" Patent " .... " 17 50
Alling " " .... " 15 50
Crane's Black " .... " 12 50
" Polish'd " .... " 13 50

Scoops.—Alling Steel Polished, No. 2 .... ℘ doz, $13 50
Alling Steeled Polished, No. 3 .... " 14 00
" " No. 4 .... " 14 50
" " No. 5 .... " 15 50
" " No. 6 .... " 16 50
" " No. 7 .... " 17 50
" " No. 8 .... " 18 50
" " No. 10 .... " 21 50
Crane's Polished, No. 5 .... " 13 50
" No. 6 .... " 14 50
" No. 7 .... " 15 50
" No. 8 .... " 16 50
Crane's Black Coal, No. 4 .... " 17 50
" " No. 5 .... " 18 00
Preston, Black Scoops No. 1 .... " 12 00
" " No. 2 .... " 12 50
" " No. 3 .... " 13 00
" Half Pol. Scoops No. 1 .... " 12 50
" " " No. 2 .... " 13 50
" " " No. 3 .... " 14 50
Lippincott, Half Pol. No. 2 .... " 15 00
" " No. 3 .... " 16 00

Wrenches.—Taft's .... dis 60 %
Coe's Imitation .... dis 50 %
Coe's Genuine .... dis 30 %

Wringers.—Novelty Clothes Wringer .... ℘ doz $72 00
Universal Clothes Wringer .... " 72 00

Chicago Metal Market.

(Reported by Cragin Bros. & Co., 141, 143, and 145 Lake St.)

Tin Plate.—
IC, 20x14, Coke .... $12 00 | IXX, 14x20, Charcoal .. 20 00
IC, 10x14, Charcoal. 13 00 | IXXX, 14x20, " ... 23 00
IX, 10x14, " . 16 00 | IXXXX, 14x20, " ... 26 00
IC, 12x12, " . 13 50 | IX, 14x14, " ... 27 50
IX, 12x12, " . 16 50 | DC, 100 Plate, " ... 13 00
IC, 14x20, " . 14 00 | DX, " ... 16 00
IX, 14x20, " . 17 00 | DXX, " ... 19 00
 | DXXX, " ... 22 00
IC, 14x20, Coke Roofing ....
IC, 10x20 Coke, for Gutters 20 00
IC, 14x20, Charcoal Roofing 12 50
IX, 14x20 " 15 00
IC, 20x28, ... 26 00
IX, 20x28, ... 32 00

Pig Tin.— | Small, 30 ℔ 41c
Large, 60 ℔ .... 40c | Bar Tin 42c

Zinc.—
In casks 1000 ℔ s .... 11 c | In sheets 11½c
" 500 " .... 11¼c | Slab 9c

Copper.—Copper Bottoms 40c
Sheathing Copper 38c
Planished Copper, 14x48 .... 46c
Size, 14x52, 14x56, 14x60 } Planished Copper 48c
Nos. 7 8 9 }

Braziers' Sheets, 30x60.—6 to 8 lbs .... 46 c | 15 to 100 lbs 40c
10 and 12 lbs .... 43c | Ingot Copper ....
 | Bolt " 45c

Solder.—Extra Fine, C. B. & Co.'s Brand .. 25c | Ordinary, No. 2 .... 21c
 | Plumbers' Solder 23c
Fine, No. 1 .... 23c | Braz'rs' or Spelt'r Solder 35c

Antimony 20c
Babbit Metal .... 15c @ 25c.
Galvanized Iron Conductor Pipe .... ℘ ℔ 10c

Sheet Iron.— Common. Smooth. Charcoal.
No. 14 to 24 .... 6 c 7¼c 8¾c
25 & 26 .... 6¼c 7½c 9 c
27 .... 6½c 7¾c 9¼c
Add ¼c ℘ ℔ for 30 in. wide.

Galvanized Iron .... dis 25 %
No. 16 to 20 .... 15c | No. 27 .... 18c
21 to 24 .... 16c | 28 .... 20c
25 & 26 .... 17c

Russia Iron.— | No. 13 c
Perfect, 8, 9 and 10 .... 23c | In Sheets, 1c. higher.
" 11 and 12 .... 22c

American Russia.— | B 14c
A .... 15c | In sheets, 1c higher.

Lead.— | Lead Pipe, in full coils 10½c
Pig .... 8½c | Lead Pipe, when cut .. 11 c
Bar .... 10c | Sheet Lead 10½c

BOSTON.

(Reported by Macomber, Bigelow & Dowse, 42 to 48 Batterymarch St.)

Axes.—Forester's Favorite, Bronzed $13 00
Blue Jackets, Blue 12 50
Chopper's Pride, Bronzed 11 00
Red Cross, Red 10 50
Red Cross, Handled 13 50
Boy's Handled Blue Jackets 12 00

Bells.—Hand .... dis 60 %
Sleigh, fancy body straps, patent leather, cloth bound, W. M., 30 bells, No. 1 .... per strap $1 70
Sleigh, patent leather, cloth bound, W. M., 36 bells, No. 1 .... per strap, $1 80
Sleigh, patent leather, leather bound, ex. tinned, 30 bells, No. 1 .... per strap $2 38
Sleigh, patent leather, leather bound, ex. tinned, 36 bells, No. 1 .... per strap $2 50
Sleigh, patent leather, leather bound, silver plated, 30 bells, No. 1 .... per strap $3 38
Sleigh, patent leather, leather bound, silver plated, 36 bells, No. 1 .... per strap $3 50
Sleigh, shaft straps, W. M., House, 6 bells, No. 1, ... per pair 75c

Bolts.—Carriage, Phila., "Girard Works .... dis 50 %
Borers.—Angle, Backus' .... dis 30 %
Boring Machines.—Angle .... each $5 25
Common, Snell's quality .... each 4 00
Breast Drills.—Miller's Falls, $30 per doz .... dis 25 %
Braces.—Barber's .... dis 40 %
Backus' .... dis 45 %
Spofford's .... dis 40 %
Butts.—Union Drilled Loose Joint .... dis 45 %
" " Wire Fast Joint .... dis 35 %
" " Acorn Loose Joint .... dis 40 %
Alden's Drilled Plain, Reversible .... dis 35 %
" " Acorn, " .... dis 25&10 %
Wrought Table Butts and Back Flaps .... dis 25 %
Wrought Narrow Butts .... dis 30 %
Carriage Jacks.—Young America .... ℘ doz $21 00
Chisels.—
Socket Framing M., B. & D's, warranted ... dis 60&10 %
Cordage.—Manila .... ℘ ℔, 18c
American Tarred Hemp Lath Yarn .... ℘ ℔, 10c
Cow Ties.—
No. 30, open ring, 3 ft., No. 6, with toggle .. ℘ doz $3 37
No. 35 " 3 ft., No. 6 " snap ... ℘ doz 3 62
No. 40 " 3½ ft., No. 5 " toggle ... ℘ doz 3 75
No. 45 " 3½ ft., No. 5 " snap ... ℘ doz 4 00
No. 50 " 4 ft., No. 4 " toggle .. ℘ doz 4 25
No. 55 " 4 ft., No. 4 " snap ... ℘ doz 4 50
No. 60 " 4½ ft., No. 3 " toggle .. ℘ doz 4 50
No. 65 " 4½ ft., No. 3 " snap ... ℘ doz 5 00
Crow Bars.—Iron, Steel Points .... ℘ ℔, 6½c
Door Springs.—Stimson's Patent.—
No. 7, Light inside doors, $12·00 .... dis 25 %
No. 8, " outside " $18·00 .... dis 25 %
Torrey's .... $4·00
Files.—Earl Smith & Co.'s English .... $5 to £ gold
American .... $5 to £ currency, less 10 %
Nicholson .... $5 to £ currency, less 7½ %
Funnel Irons.—$2·50 $2·50 $2·50 $3·25 per doz
5, 5½, 6, 7 inch
Deep Flange, $3·50 $3·75 $4·00 per doz
5, 5½, 6 inch
Gauges.—Star Tool Co. .... dis 33⅓ %
Hammers.—Maydole .... dis 5 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, $·75 " " bell face, No. 1, $11; 1½, $9·75.
Hangers & Rollers.—Novelty .... dis 30 %
Hatchets.—Underhill Edge Tool Co. .... dis 10 %
Underhill pattern, solid, C. S. lathing $9 50
Hinges.—Strap and T. Stanley Works .... dis 30&7½ %
Plate, Loose, and Fast Joint .... ℘ ℔, 8c
Wrought Screw Hook .... ℘ ℔ 8c
Locks.—P. & F. Corbin .... dis 40 %
No. 403, Iron Face and Bolts, Mortise, 3¼ inch, per doz net $1 88
No. 1000, reversible rim knob $2 25
Mattocks.—K. P. & Co., axe finish, long cutter .. $13 75
Short cutter 13 50
Meat Cutters.—"Miles'," .... dis 15 @ 20 %
No. 1, $22; No. 2, $30; No. 3, $40 per doz.
American, $6 each .... dis 25 %
Metal.—Babbitt, No. 1, 35c; 2, 25c; 3, 16c; 4, 15c ℘ ℔
Nails.—10d and larger $4 75
Paper.—Finest Quality Manila .... ℘ ℔ 11c
Parers.—Reading, New Pattern .... per doz $8 00
Turn Table .... per doz 8 50
Picks.—K. P. & Co., Polished Points—
5 to 6 .... per doz $10 00; 6 to 7, $10 50
Pulleys.—Clark & Co.'s Axle, 1¾ in.—
.... per doz 87c.; 2 in., 42c
No. 115, Axle, 1¾ in. .... per doz 37c
Plated Ware.—Rogers Bros. .... new list dis 30 %
Pocket Knives.—Conn. Cutlery Co. .... new net list
Rivets.—Black .... dis 25 %
Carriage, oval head, Nos. 3, 4, 5, 6, 7, 8, 13 13 14 14 15 16c ℘ ℔ net
Sad Irons.—Reading .... ℘ ℔ 4½
Saws.—Disston's .... dis 12½ %
Lightning X cut, Boynton's .... per foot 67c
" Saw Blades, 32 inch .... per doz $7 00
" Framed Saws .... per doz $9 00
Common " " .... per doz 6 00
Disston " " .... per doz 9 00
One man X cut.—Lightning .... $2 75 each
Disston's $3·00 each .... dis 12½ %
W. M. & C., "Handy" Framed Saws .... ℘ doz $13 50
Saw Clamps.—Reading .... $11·25
Screws.—American Screw Co. .... dis 47½ %
Shovels.—O. Ames .... new list dis 10 %
M. B. & D. .... dis 10&5 %
Snow, malleable iron tip, D handle .... $6·50
" " " plain .... 5·50
Sifters, Coal.—McMasters .... $12·00
Sinks.—Cast Iron, 2, 2½, 3, 3½, 4, 4½ feet.
$1·37 $1·62 $2·25 $2·75 $3·75 $4·75 each.
Tools.—Aiken's Pattern, 20 in set; Miller's Falls, $12·00 per doz. .... dis 15 %
Traps.—Oneida .... dis 20 %
Blake's .... dis 20&5 %
Vises.—K. P. & Co.'s Solid Box, Blacksmith ... ℘ ℔ 15½c
Parker's Parallel .... dis 5 %
Backus .... dis 25 %
"Howards," Parallel .... dis 15 %
Weights.—Window Weights .... ℘ ℔ 2¼c
Wrenches.—Coe's Genuine Wrenches .... dis 40 %
Wringers.—
Novelty and Universal } Tub No. 2 } less than 5 doz .. ℘ doz $72 00
5 doz .. ℘ doz 69 00
10 doz .. ℘ doz 67 00
Monitor, Double Cogs .... per doz 66·00
Novelty Bench, No. 4, } less than 5 doz .. ℘ doz 108 00
5 doz .. ℘ doz 104 00
10 doz .. ℘ doz 101 00
Zinc.—Sheet .... ℘ ℔ 10½c

Boston Metal Market.

(Corrected by Fuller, Dana & Fitz.)

Tin Plates.— ℘ box | I. C. Coke .... @ $12 00
I. C. Charcoal .. @ $13 00 | " Terne .... 11 50 @ 13 00
Pig Tin.— ℘ ℔ | Straits 38c
Banca .... 40c | English 38c
Copper.— ℘ ℔ | Bolt 40c
Sheathing .... 38c | Ingot 26c
Lead.— ℘ ℔ | Sheet and Pipe .... 9·45c
Spanish Pig 8c
Spelter .... ℘ ℔ 9c
Zinc.—Sheet .... ℘ ℔ 10½c
Antimony .... " 17c
Iron.—Sheet Iron, Russia .... " 20c
Sheet Iron, English .... " 6½c
" " American .... " 8¼c
" " Galvanized .... " 12½c
Swedes Bar Iron, Flat, gold .... ℘ ton, $145 00 @
" Shoe Shapes, gold .... 150 00 @
Norway Bar Iron, Flats, gold .... 145 00 @
" Shapes, gold .... 150 00 @
" Round, 2 in. to ¾ in., gold .... 145 00 @
" " 11-16 to ⅜ in. " .... 157 50 @
" " 5-16 to ¼ in. " .... 160 00 @
" Nail Rods, Rolled " .... 177 50 @
" " U. B. " .... 172 50 @
" " Benzon " .... 167 50 @
" " Vasa " .... 160 00 @
" " N J W " .... 157 50 @
English Refined Bar Iron .... 77 50 @
Scotch Pig Iron .... 46 00 @ 50 00
American " .... 38 00 @ 40 00
Wrought Scrap Iron ....

Steel.— ℘ ℔ | German 11c
Eng. Tool .... 18c | Spring 8½c
American Tool .... 15½c | Tire 7½c
" Mach .... 11c | Sleigh Shoe 6¾c
Bessemer .... 8 c @ 8½c | Toe Calk 8½c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Anvils.—Armitage .... ℘ ℔, gold, 15c
Peter Wright's .... " 14½
Wilkinson's .... " 12½
Apple Parers.—Conqueror .... ℘ doz, $9 00
Lightning .... " 9 00
Turn Table .... " 9 00
Augers and Bits.—Cook's .... dis 25 %
Ives' .... dis 20 %
Jennings' .... dis 5 %
Snell's .... dis 12½ %
Axes.—Hunt's .... ℘ doz $14 00 @ 15 00
Lippincott's .... " 13 50 @ 14 50
Lippincott's Pioneer .... " 14 00 @ 15 00
Simmons' .... " 12 50 @ 13 50
Axles.—Kritch & Crane Mfg. Co. s—
Patent Taper Axles .... dis 10 %
Swelled Taper Axles .... dis 10 %
Concord Axles .... dis 10 %
Red Jacket Axles .... dis 10 %
Common Axles, 1½ inch and upward .... ℘ ℔, 8½c
" " less than 1½ inch .... " 9½c
Bells.—Troy, Church .... ℘ ℔, 30c
Light Brass, Hand .... dis 50 %
Moore's, Cow .... dis 10 %
Bolts.—Arms, Bell & Co.'s Machine .... dis 10 %
Arms, Bell & Co.'s Carriage and Tire .. new list dis 70 %
Norway Iron Carriage and Tire .... dis 40 %
Cast Iron Barrel, Shutter, &c. .... dis 25 %
Cast Butt Hinges.—Narrow Fast Joint .... dis 25 %
Broad Fast Joint .... dis 40 %
" Loose " .... dis 50 %
Reversible .... dis 45 %
" Japanned and Silver Tipped .... dis 40 %
Loose Joint "Acorn" " " .... dis 40 %
Excelsior Reversible Blind .... dis 30&10 %
Lull & Porter's Blind .... dis 40 %
Wrought Butts.—Narrow .... dis 20 %
Reversible .... dis 25 %
Broad .... dis 25 %
Table Hinges .... net list
Back Flaps .... net list
Inside Blind Hinges .... net list
Casters.—Porcel'n Wheel Bed or Plate .. rev. list dis 15 %
Iron or Brass Wheel Bed or Plate ....
Chain.—Eng. Coil .. 3-16 ¼ 5-16 ⅜ 7-16 ½ in.
14 11½ 10¾ 10 9¾ 9c gold
Trace .... 6½-10-2 70c "
7-10-2 75c "
German Coil and Halter .... new list add 15 % "
American Coil—Short Link.
Size, inches .... ⅜ 7-16 ½ 9-16 ⅝
Price cents ℘ ℔ .... 12¾ 12½ 10¼ 10 9½ net
Size, inches .... 11-16 ¾ 13-16 ⅞ 15-16
Price, cents ℘ ℔ .... 9½ 8¾ 8¾ 8½ 8¾ net
Size, inches 1 1 1-16 1⅛ 1 3-16 1¼
Price, cents, ℘ ℔ .... 8¼ 8¼ 8 7¾ 7¾ net
All larger sizes same price as 1¼ in. Stud chain 1c less than same size close link.
Chisels.—Socket, Firmer or Framing .... dis 55 %
Clothes Wringers.—Crown .... ℘ doz $60 00
Novelty .... " 72 00
Universal .... " 72 00
Monitor .... " 72 00
Coffee Mills.—Parker's .... net list
P. S. W. & Co.'s .... net
Corn Knives.—Dunn Edge T'ol Co.'s Clip .. ℘ doz $5 75
Disston's .... " 6 00
Crow Bars.—Steel Pointed .... ℘ ℔ 8 @ 10c
Solid Cast Steel .... " 20c
Cutlery.—J. Russell & Co.'s .... }
Lamson, Goodnow & Co.'s .... } new list, dis 20 %
Landers, Frary & Clark's .... }
Files and Rasps.—
Nicholson's Mill Files .... $5 50 to the £, currency
Nicholson's Other Files .... 5 00 to the £, currency
Butcher's Files .... 7 00 to the £, currency
Heller's & Bros. Horse Rasps .... 5 25 to the £, currency
Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks .... dis 25 %
" " Handled Hoes .... dis 25 %
" " Planter Eye Hoes .... add 20 %
Winsted's Planter Eye Hoes .... add 25 %
Hammers.—Yerkes & Plumb .... new list net
Masons' Hammers .... ℘ ℔ 20c
Smith Hand Hammers .... " 22c
Handles.—Axe .... Extra. No. 1. No. 2. No. 3.
$2·75 $2·25 $1·75 $1·00
Pick .... Extra. No. 1. No. 1½. No. 2.
$2·50 $2·00 $1·75 $1·25
Smith & Montross Fork, Hoe and Rake .... dis 10 %
" " Broom and Mop .... $12 @ $18 ℘ M.
Harrow Teeth.—1 inch iron .... ℘ ℔ 5¼c
⅝ and ¾ inch iron .... " 5½c
⅝ inch iron .... " 5¾c
Barbed or Headed .... ½c extra
Hatchets.—Hunt's .... net list
Simmons' .... dis 10 %
Hay Knives.—Lightning .... ℘ doz $22 00
Dunn Edge Tool Co.'s .... ℘ doz $14 50—dis 15 %
Fisher's .... " 16 50—dis 10 %
Hinges.—Strap and T—St. Louis make .... dis 25 %
Horse Nails.—Eureka .... 23c rates
Ausable .... 22c "
Northwestern .... 22c "
Eagle .... 19c "
National Patent Pointed .... 21c "
" " " Extra Finished .... 22c "
Horse Shoes.—R. I. (Perkin's pat.) .... ℘ keg $6 75
Burden's .... " 6 75
Mule Shoes .... $1 00 extra
Rhode Island Trotting Shoes .... 2 50 "
Locks and Latches.—
Jones & Nimick's .... revised list dis 40 %
Moorhead, Adams & Co. .... dis 40 %
Norwalk Lock Co.'s revised list .... dis 35 %
Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks .... ℘ doz. $15 00 @ 16 00
" Grub Hoes, Oval Eye .... ℘ doz. 12 00 @ 13 00
Nails.—Wheeling .... $4 60 rates.
Orders for 100 kegs 10c ℘ keg less.
Picks.—Klein, Logan & Co.'s R. R. and Clay ℘ doz. $12 00
Klein, Logan & Co.'s Coal .... " 9 75
" " Poll .... " 12 00
" " Stone .... " 16 50
" " Tamping .... " 19 00
Planes.—Ohio Tool Co.'s .... dis 15 %
Eastern .... dis 20 %
Post Hole Augers.—Clark's Patent—
No. 1, ℘ doz. $27; No. 2, $30; No. 3, $32 .... dis 20 %
Barton's Patent .... ℘ doz $25—dis 20 %
Vaughn's " .... " 25—dis 10 %
Sad Irons.—Monitor Brand, Silver Polished .... ℘ ℔ 5c
Sash Weights.—Standard Solid Eyes .... ℘ ℔ 3¼c
Saws.—Disston's .... dis 10 %
Spear & Jackson's .... $5 00 to £ gold
Hubbard, Lippincott, B. & Co.'s .... dis 10 %
Branch, Crooks & Co.'s .... dis 10 %
Livingston's Patent Buck .... net list
Screws.—American Screw Co.'s revised list .... dis 45 %
$2000 worth in 6 months .... 2½ % extra
Scythes.—Blood's C. S. & G. S. .... net list
Dunn Edge Tool Co.'s .... new list dis 2 %
Paris Furnace Co.'s .... dis 2 %
Waldron's English .... $10 00 to £
Scythe Stones.—No. 1 Ind'n Pond ℘ gr's, $7 00 }
Extra Indian Pond .... " 7 50 } dis 25 %
Premium .... " 9 50 }
Diamond Grit .... " 13 50 }
Shovels, Spades and Scoops.—
Ames' .... revised list dis %
Lippincott's .... new list dis 10 %
Rowland's, Maxwell .... revised list dis 10 %
Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished .... ℘ ℔, 17c
Solid Cast Steel .... " 35c
Striking Sledges .... ℘ ℔ extra, 1c
Snaths and Cradles .... dis 30 %
Springs.—Cleveland Spring Co.'s—
Carriage and Express .... dis 5 %
Blue Seat Springs .... new list dis 10 %
Tacks.—Norway Tack Co.'s ½ weight .... dis 67½ %
Brads .... dis 50 %
Traps.—Newhouse Patent .... dis 15 %
Reichard's Animal, Wood Bottom .... ℘ doz $10 00
" " Metal Bottom .... " 12 00
Vises.—Solid Box .... ℘ ℔ 15c
Wilson Mfg. Co.'s .... dis 15 %
Wrenches.—Coes' Genuine .... dis 30 %
Coes' Pattern .... dis 40 %
Taft's .... dis 50 %

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellew & Co.

Tin Plate.
IC, 10x14, Charcoal ... $12 00 | IC, continuous, 20 in. x 200 ft. ....
IX, 10x14, " ... 15 00 |
IC, 12x12, " ... 12 50 | IX, continuous, 20 in. x 200 ft. ....
IX, 12x12, " ... 15 50 |
IC, 14x20, " ... 13 00 | IC, 10x14, best Coke .. $11 00
IX, 14x20, " ... 16 00 | IC, 10x14, good " .. 10 50
IC, 14x20, Terne .... 11 50 | IC, 10x20 .... 18 50
IX, 14x20, " .... 14 50 | IC, 14x20 .... 11 00
IC, 20x28, " .... 25 00 | IC, 14x20, Coke Lead. 1 (
IX 20x28, Terne 30 00

Block Tin.
Large Pigs .... 40c | Bars ....
Small " 41c

Sheet Zinc.
Casks .... ℘ ℔ 10½c | Sheet .... ℘ ℔

Solder.
No. 1, Refined, in bars or plate 23c
No. 2, " " 21c
Pig Lead 8c

Sheet Copper.—18 to 100 lbs. Sheets 30x60 .... 40c
14 to 16 lbs., Sheets 30x60 .... 40c
10 to 12 lbs., " and 20x72 .... 48c
6 to 9 lbs. 46c
Tinned, 14 and 16 oz. 14x48 .... 55c
Planished, 14 and 16 oz. 14x48 .... 46c
" No. 7, 8 and 9 .... 48c
Copper Bottoms 37c

Sheet Iron.— Com'n Sm'th. Char'l. Jun.
No. 16 to 20 .... 6c 7c 8½c
No. 22 to 24 .... 6c 7c 8¼c
No. 26 .... 6¼c 7¼c 8¾c
No. 27 .... 6½c 7½c 8¾c

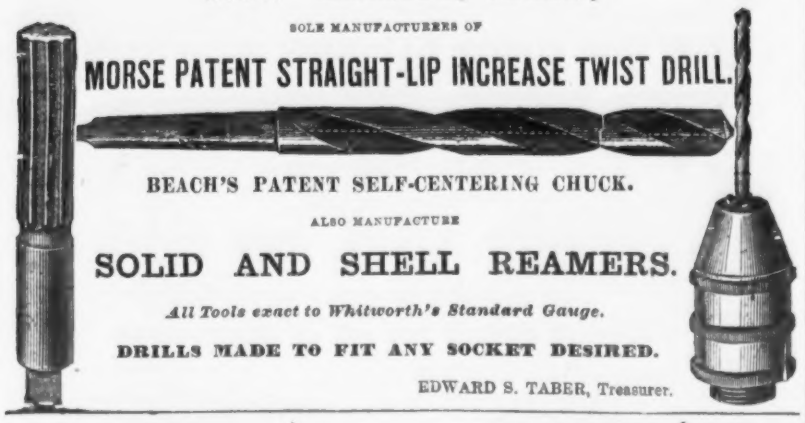
Galvanized Iron .... dis 25 %
Iron Rivets .... dis 20 %
Iron Wire .... dis 30 %
Coppered Market Wire .... dis 20 %
Copper Rivets and Burs .... dis 10 %
Russia Iron.—Nos. 9, 10, 11 and 12, ℘ 22
No. 1, stained, ℘ ℔ 21
Imitation Russia, ℘ ℔ 11

Machinery, &c.

Morse Twist Drill and Machine Company,

New Bedford, Mass.,

SOLE MANUFACTURERS OF



MORSE PATENT STRAIGHT-LIP INCREASE TWIST DRILL.

BEACH'S PATENT SELF-CENTERING CHUCK.

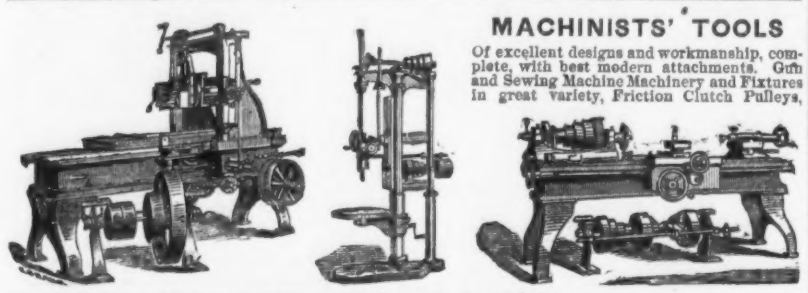
ALSO MANUFACTURE

SOLID AND SHELL REAMERS.

All Tools exact to Whitworth's Standard Gauge.

DRILLS MADE TO FIT ANY SOCKET DESIRED.

EDWARD S. TABER, Treasurer.



MACHINISTS' TOOLS

Of excellent designs and workmanship, complete, with best modern attachments. Gun and Sewing Machine Machinery and Fixtures in great variety, Friction Clutch Pulleys,

Water-Power Organ Blowing Apparatus, Special Machinery, &c., made by

THE PRATT & WHITNEY COMPANY, Hartford, Conn.

Established 1848.

WM. SELLERS & CO.,

1600 Hamilton Street, PHILADELPHIA.,

Engineers, Iron Founders and Machinists.

RAILWAY SHOP EQUIPMENTS.

Our Steam Hammers, Lathes, Planers, Drills and Bolt Cutters

Are of Improved and Patented Construction.

Railway Turning and Transfer Tables,

SHAFTING & MILL GEARING, a specialty.

Pivot Bridges.

GIFFARD'S INJECTOR--IMPROVED, SELF-ADJUSTING.

LINCOLN'S MILLING MACHINES.

PHŒNIX IRON WORKS.

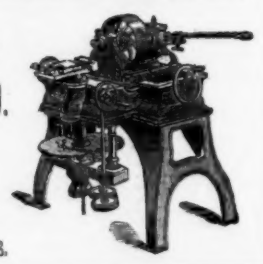
GEO. S. LINCOLN & CO.

HARTFORD, CONN.

Machinists' Tools,

AND

LINCOLN'S FRICTION CLUTCH PULLEYS.



Fairmount Machine Works,

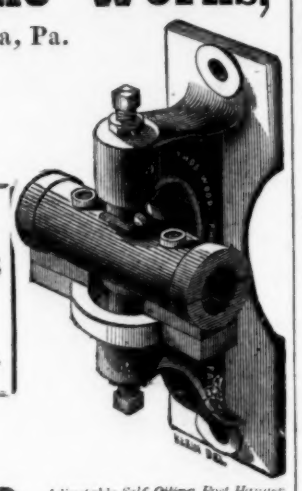
Office, 2106 Wood St., Philadelphia, Pa.

POWER

HOISTING MACHINES

WITH OR WITHOUT

CAGE AS REQUIRED.



ADJUSTABLE SELF-OILING HANGER.

THOMAS WOOD, *Adjustable Self-Oiling Post Hanger 6 in. from post to center of shaft.*

MANUFACTURES AS SPECIALTIES

POWER LOOMS, with (new) Patent Box Motion. SPOOLING, BEAMING, DYEING and SIZING MACHINES.

BOBBIN WINDING MACHINES—wind direct from hank or skein to shuttle bobbin.

SHAFTING, with Patent Adjustable Self-Oiling Bearings.

PULLEYS, from 4 inch to 10 feet diameter, of most Approved Pattern.

SELF-ACTING WOOL SCOURING MACHINES, (Yewdall's Patent.)

Machines and Foundry Work in all their branches. Send for Price Lists, Pulleys, &c.

The "EMPIRE," a Fan Blowing PORTABLE FORGE,

(Patent Applied for.)

Without BELTS or BELLOWS.

It is more Easily Worked, gives a Better Blast, and is the Cheapest forge made, and

☞ It has no Back Draught.

W. P. KELLOGG & Co., Troy, N. Y.

And 118 Chambers St., N. Y.

Also Curry Combs, Boring Machines, and Cooley's Whip Racks, etc., et

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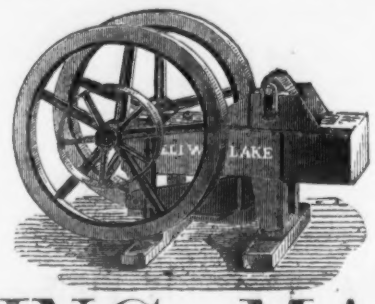
Machinery, &c.

IMMENSE SAVING OF LABOR.

BLAKE'S



PATENT

CRUSHING MACHINE

for reducing to fragments (of any required size) all kinds of

Hard and Brittle Substances, such as

ROCKS, ORES, MINERALS AND DRUGS.

For Circulars containing particulars and numerous testimonials, for Price Card, or for other information in the premises, address

BLAKE CRUSHER CO., New Haven, Conn.,

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Persons visiting New York City can see a Crusher in operation at 137 Elm Street, where M. B. WASHBURN will give information and prices and receive orders.

A. S. GEAR,

Sole Owner and Manufacturer of the GEAR VARIETY MOULDING MACHINE,

LEGALITY OF PATENTS SUSTAINED BY THE U. S. CIRCUIT COURTS,

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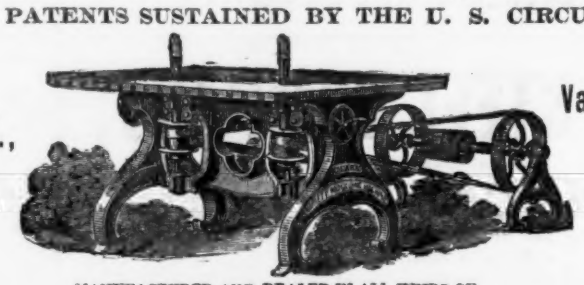


PRICE OF Variety Moulders

$150 00
175 00
330 00
430 00
530 00

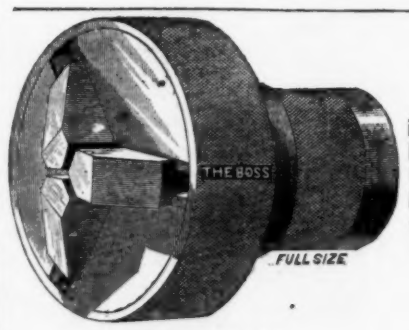
MANUFACTURER AND DEALER IN ALL KINDS OF

Wood and Iron Working

MACHINERY,

STEAM ENGINES AND MECHANICAL SUPPLIES,

Railroad Car Shops fitted out Complete. Send for Catalogue and Price List.



Patented Dec. 24th, 1872.

The BOSS Drill Chuck

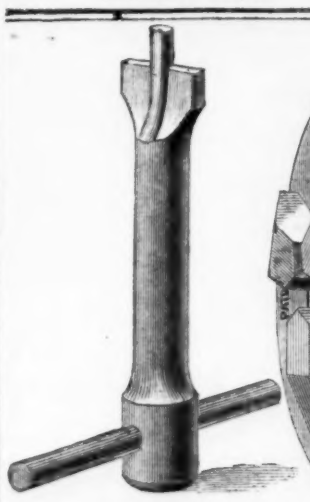
is warranted to be the best and most perfect made Chuck in use. It holds from 0 to three-eighths inch, and is truly the Boss Chuck. Every piece is made of Forged Steel, and finished to a Gauge. Give it a trial and you will be satisfied; if not, return it at my expense, and your money will be refunded. Address

A. F. Cushman,

Manufacturer of all kinds of Lathe Chucks,

HARTFORD, CONN.

Orders from the trade solicited.



THE "DANBURY"

UNIVERSAL JAW

DRILL CHUCK,

C. H. Reid's Patent August 12, 1873.

Most POWERFUL Chuck made. Holds drills from 0 to ½, and by turning down shanks to ½, will hold—without slipping in the *most trying work*—up to one inch, inclusive. Its action is *direct*, quick and positive. Mechanical movement is such that it cannot *clog*, *set*, or in *any way* "get out of order." Has now been in constant use six months, working *perfectly*. Every Chuck is sold on *full warrant*, to be returned and cash refunded if not entirely satisfactory. Address

F. A. HULL & CO., Manufacturers,

DANBURY, CONN.

Its "points of special excellence" are Strength, Accuracy, Durability, Cheapness.

Send for Illustrated Descriptive Circulars.

THORNE, DeHAVEN & CO.,

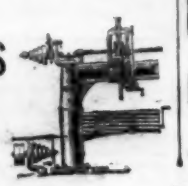
Twenty-first Street, above Market, Philadelphia.

PATENT

PORTABLE DRILLING MACHINES

PATENT

RADIAL DRILLING MACHINES.



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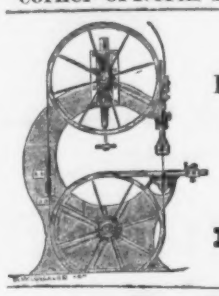

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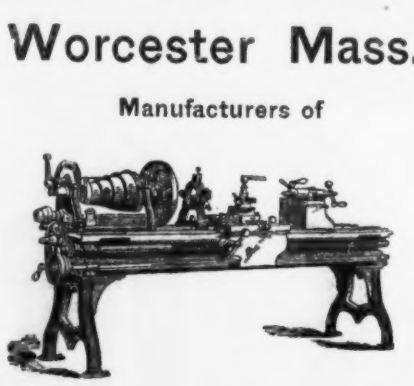

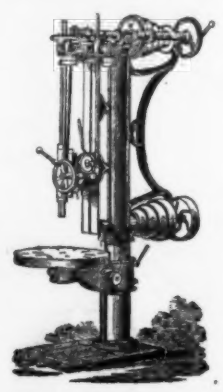

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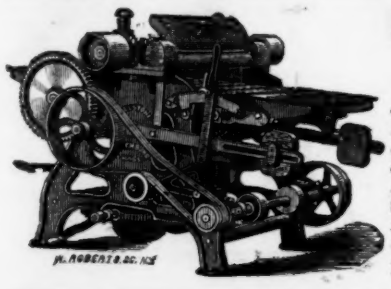

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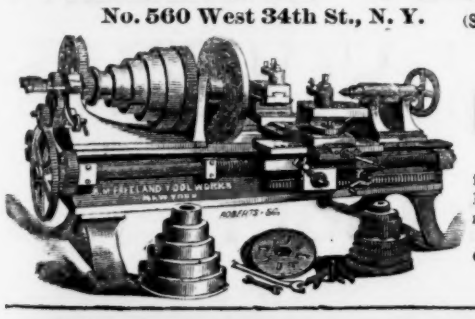

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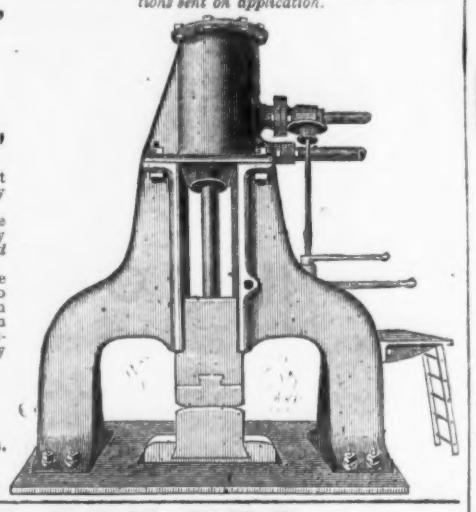

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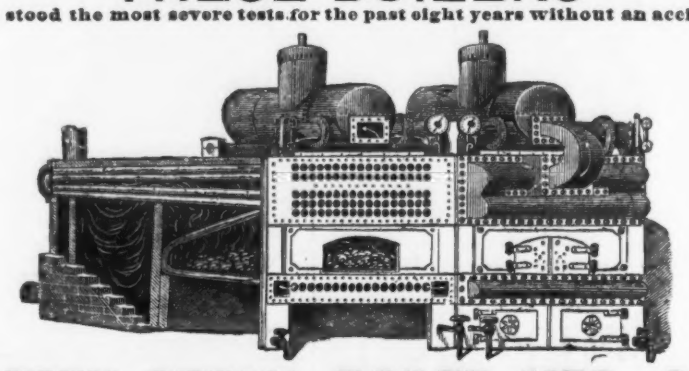

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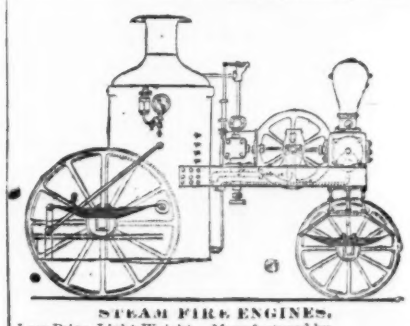

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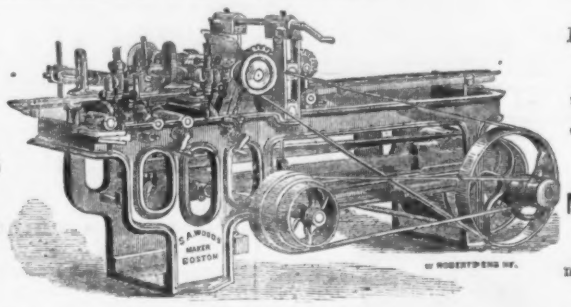

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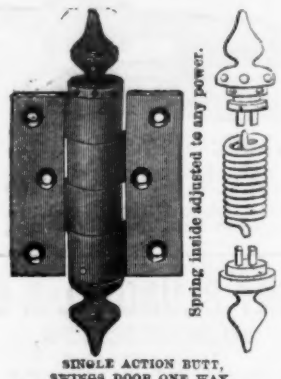

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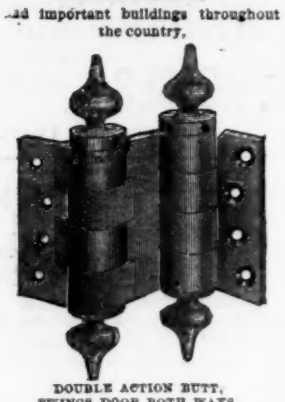

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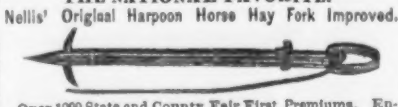

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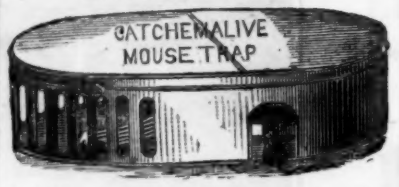

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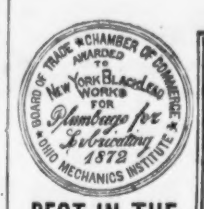

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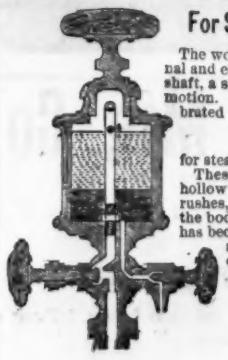

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